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CONTENTS

| | Page |
|---|------|
| CONSERVATION: RETROSPECT AND PROSPECT | |
| H. Bowman Hawkes | 3 |
| CULTURE AND THE IDEA OF NATURE | |
| Clarence J. Glacken | 23 |
| THE GEOGRAPHIC DYNAMISM OF CALIFORNIA MARKET GARDENING | |
| Howard F. Gregor | 28 |
| TWO ISOCHRONIC MAPS OF SETTLEMENT IN OREGON | |
| Georgia Ellen Adams | 36 |
| THE 'LOGIC' OF THE SEVENTEENTH PARALLEL AS A BOUNDARY IN INDOCHINA | |
| Forrest R. Pitts | 42 |
| LIVESTOCK ORGANIZATION IN THE FORMERLY NOMADIC LIVESTOCK AREAS OF THE SOVIET UNION | |
| Howard K. Albano | 57 |
| THE DEVELOPMENT AND SIGNIFICANCE OF TEA CULTIVATION IN THE SOVIET UNION | |
| Robert M. Bone | 63 |
| THE ASSOCIATION OF PACIFIC COAST GEOGRAPHERS | |
| Nineteenth Annual Meeting, Seattle, Washington, June 14 - 16, 1956, Program of the Meeting | 74 |
| Abridged Report of the Secretary-Treasurer | 75 |
| Officers, 1956 - 1957 | 75 |

CONSERVATION: RETROSPECT AND PROSPECT*

H. Bowman Hawkes

University of Utah

Preface

As a prefatory note I would like to explain briefly and in personal terms just what prompted this essay on conservation. I have never included in my areas of special interests the field of conservation and after the discourse this evening I do not suppose I will ever venture into the field again, even though the detour was most profitable. The motivation to explore the unfamiliar realm of conservation was an outgrowth of three rather fortuitous situations. (1) I am a native of Utah and as a typical Utahn I am, I suppose, overly sensitive about water. One does not shrug easily from his shoulders fifteen years of living on the parched and partially irrigated sagebrush and salt grass flats west of Ogden. The sharpest, most colorful, saddest memories of this period are associated with water or, more correctly, the scarcity of water. To stand as a boy in a beet field on a scorching July afternoon and note the wilted plants that have not had water. One does not shrug easily from his shoulders fifteen years of living on the parched and partially irrigated sagebrush and salt grass flats west of Ogden. sounds to frighten a small boy, and be prepared, in the event some one tampered with the diversion gate, to mount the "bally" pony and ride with the dastardly news that "sumuns a stealin' our water!" is an experience not easily forgotten; to watch Dad's grim face as he took the sixteen gauge double-barrelled shotgun from the granary and head back toward the headgate and then the long wait—half hoping and half fearing that the blast would be heard—are events that characterized my boyhood days on an inadequately irrigated farm.

(2) I gave up my birthright, in part, as a Utahn, when I was adopted as a son of the Buckeye State. In Ohio I learned that resources such as water mean different things to different people. Some years later upon the return of the native, I found in Utah the struggle over water just as impetuous as in the days before "Big Dams." The difference is one of magnitude and complexity—the Colorado River in contrast to a piddling little irrigation stream. I assure you that I have absolutely no intention of getting involved in the controversy this evening. But from the charges and countercharges that have "charged" the air in Utah for several years past, there arise provocative questions about the fundamentals of conservation. Both the accused and the accuser wave the banners of conservation with equal fervor; both profess to be acting in the best interests of society. Is there a best answer to the dilemma? Should there be one? The urge was strong to accept the editorial comments of the local newspapers but reason pleaded for a suspended judgement.

*Presidential address of the Association of Pacific Coast Geographers, Seattle, June, 1956.

(3) The need for a Presidential address at the Annual Meeting of the Association of Pacific Coast Geographers was sufficiently great to bring the fragmented material and interests together. The results of the investigation have taught me much, especially the fact that there is a lot to learn about conservation. As I scanned the literature prepared by geographers I was impressed with two features: (a) the wealth of factual and descriptive material that finds its most effective expressions in the conservation textbooks; and (b) the spotty nature of the literature dealing with the fundamental ideas of conservation that would shed some light upon the specific provocations associated with Echo Park Dam. Thus in the search for answers I was obliged to go elsewhere. If, in so doing, I have moved the theme, as well as the references, beyond the canopy of geography, the action was prompted by the conviction that the central theme is fundamental to a fuller understanding of the conservation movement.

Introduction

The field of conservation may be viewed in two directions, namely, (1) across the woof of the contemporary scene, and (2) along the warp of the pattern in time. Both views contribute to an understanding of the picture. A cursory glance across the edges of the contemporary scene reveals strength in numbers and weaknesses in divergent opinions. The flood of conservation literature in the form of articles, books, editorials, and government documents suggests that the theme of conservation of natural resources is a live issue today. To run down the long list of organizations that belong to the National Resources Council of America is an exceptional experience since it acquaints one with the breadth of allegiance to the cause of modern conservation. To scrutinize more closely, however, the content of the articles and books, and to probe more deeply into the interpretations of conservation as made by the organizations, leave the investigator with the impression that the fires of enthusiasm burn, but in different camps.

Two points of view regarding conservation become evident as one examines the frayed edges of the contemporary cross-section. (1) There are conservationists who advocate the use of the earth for the permanent good of all men; there may be some differences of opinion as to what constitutes the "good" use and by whom the use should be administered, but they are all agreed upon some form of utilization, in short, theirs is a liberal philosophy based upon material values. (2) On the other hand there is a small, dedicated group who carry a banner of conservation ideals with a religious fervor. To them the non-material values should be given precedence over the material designs regardless of the number of people who may benefit. Theirs is a conservation philosophy based upon a teleological view of the earth and man's relation to it.¹ Between the hard cores of these two views are found a variety of hues that blend in either direction.

¹In a rather short, but well documented and scholarly article, Clarence J. Glacken words the same observation tersely and effectively. He writes, "Historically, the view of the earth as a planet designed and made habitable for all forms of life has involved two attitudes toward living nature: it is beautiful and it is useful." Source listed under literature cited at the end of this article.

In order to appraise more accurately the true meaning of the two philosophies of conservation as evidenced in the modern scene, the investigator would search along the warp of the pattern in time. This perspective reveals much; it becomes immediately apparent that the story of conservation is the ageless story of man and land. In retrospect the beginning is lost in antiquity; in prospect the future fades into a mist of speculation. A common thread ties the intervening expanse together, namely, man's dependence on the earth's endowments to satisfy certain needs and desires. There are also patterns of thought that extend along the warp in the time sequence that lend a continuity to the picture. Some of these patterns are indefinite, but the more important ones seem to persist. It is constancy, rather than sharp change, that characterizes the scene. There may be observable and significant differences in intensity and these differences may have important implications, but structure and form seem to carry on.

At the close of the last century a new hue appeared in the conservation pattern in America; prevailing attitudes regarding man's relation to the natural endowments were questioned. The change of mind is recognized in this study as an important event, thus identifying Theodore Roosevelt's administrations as a significant time meridian in the history of conservation. It provides a vantage point from which a retrospect and a prospect of ideas and events may be made. It gives, at least, an arbitrary datum around which four periods may be defined; namely, pre-Theodore Roosevelt, Theodore Roosevelt, post-Roosevelt, and future. The following discussion is presented within this chronological framework.

Pre-Theodore Roosevelt Period

A new direction was given resource consciousness in America at the turn of the nineteenth century. What brought about this shift? What made the new doctrines so readily acceptable? In order to understand the why and wherefore of the change, it is necessary to review briefly the economic, political, and scientific thought prior to 1900.

During most of man's sojourn he has been subjected to social controls of various degrees from tribal taboos to political tyrannies. Man has played, for the most part, the role of slave and servant. In western society the social controls of the old order commenced to weaken with the Reformation, with the period of great discoveries and inventions, and with the growing convictions that the individual has certain inalienable rights. The trend culminated in the reduction of governmental control over business and the rise of the *laissez-faire* doctrine of free trade and free enterprise. The ideologies that crystallized during this period of Western and especially Anglo-American economic history have influenced even to the present time, the nature of man's relationship to the earth's resources. Such concepts as the belief in private business as a superior agency over politics in promoting public welfare or the idea that free competition in the business world would result in a harmonious balance between society and private interests are features that have been brought forward and characterize "Big Business." In 1890, Alfred Marshall² questioned the relentless pursuit of individual interests as achieving the common good and declared the need for public regulation in the interests of society.

Muir and the Concept of Balance: During the nineteenth century natural science was also committed to a belief that all things move according to natural law, that in time a balance and harmony had been established between natural phenomena. This balance was maintained, so it was believed, until man in his blundering manner entered the stage and upset the harmony.

Among the many able defenders of this point of view could be listed such notable naturalists as von Humboldt, Agassiz, Marsh, and Muir. In this study, the work of John Muir has been selected as exemplary of the school of thought that supports the idea of cooperation, harmony, and balance in nature as a requisite to life. Not that Muir symbolizes the cause any more effectively than does the work of others who carried the same banner, but he was afforded that rare opportunity to champion his cause during and just prior to the Theodore Roosevelt administration. Furthermore, Muir received the baton of responsibility from his predecessors and colleagues and passed it confidently on even to the present day. Thus the works of others will be contrasted with the thinking of this noted naturalist, mystic, and prophet.

Note the cadence and message of this quote:

The glacier was God's great plow and when it
was vanished from the surface of the land it
left it prepared for the hand of the husbandman.³

Note now the similarity of style and viewpoint in this quote:

But the glaciers . . . work apart from men
exerting their tremendous energies in silence
and darkness . . . until the fullness of time
the mountains and valleys are brought forth,
channels furrowed for the rivers, basins made
for the meadows and lakes, and soilbeds spread
for the forests and fields that man and beast
may be fed.⁴

The first is by Louis Agassiz, the latter by John Muir. It is the evidence of law, order, creative intelligence, loving design that these men found in natural processes that placed them in the same camp. How much Muir may have been influenced by Agassiz is difficult to ascertain, but how much they had in common is indeed easy to appraise.

We find in Muir's philosophy of nature von Humboldt's grasp of cosmic unity and beauty amid the complexity of natural phenomena. Catch the import of this description of a talus slope.

If for a moment you're inclined to regard these taluses as mere bedraggled, chaotic dumps, climb to the top of one of them, tie your mountain shoes firmly over the instep and with braced nerves run down without any haggling, puttering hesitation boldly jumping from boulder to boulder with even speed. You will then find your feet playing a tune, and quickly discover the music and poetry of rock piles . . . and all nature's wildness tells the same story. Storms of every sort, torrents, earthquakes, cataclysms, convulsions of nature, etc., however

mysterious and lawless at first sight they may seem, are only harmonious notes in the song of creation, varied expressions of God's love.⁶

From George P. Marsh's work, Muir drew inspiration and knowledge. He recognized in Marsh the first American to lay down for the populace the broad principles of conservation and to demonstrate, by the examples from other countries, the direction America was headed by wantonly wasting her forests. These broad principles were based upon the doctrine of ecological balance. "Disturb the balance in nature's economy or in society," Muir wrote, "and you reap droughts, floods, wars, class struggles, revolutions. These will continue until man shall have learned the universal law of cooperation."⁶

George Marsh, perhaps more than any writer of the nineteenth century, pointed up the severity and the implications of the impact of man upon the earth. Without reservation he states that it is impossible to measure the share which human action has had in augmenting mountain degradation and the formation of plains. The effect of man is "as blasting as those generally ascribed to geological convulsions and has laid waste the face of the earth more hopelessly than if it had been burned by a current of lava or a shower of volcanic sand."⁷

In the most indefatigable manner, he proceeds to develop in his works the theme that balance was maintained before man appeared and a balance is to be re-established if life is to be preserved. In the footnote on the last page of his classic work is found the ultimate statement:

No atom can be disturbed in place . . . without affecting the surrounding atoms. Every human movement, every organic act, every volition, passion, or emotion, every intellectual process is accompanied with atomic disturbances and hence, every such movement, every such act or process, affects all the atoms of universal matter. . . . Hence there exists . . . in external nature an ineffable, imperishable record . . . of every act, every word uttered, nay of every wish and purpose and thought conceived by mortal man, from the birth of our first parents to the final extinction of our race. So that the physical traces of our most secret sins shall last until time shall be merged in that eternity of which not science but religion alone assumes to take cognizance.⁸

Muir: Son of the Wilderness: The young naturalist John Muir took his lessons to the high Sierras for meditation; he came down from that mountain retreat, a crusader, carrying the banner that Marsh had brandished. He said, ". . . wilderness is a necessity . . . mountain parks and reservations are useful not only as fountains of timber and irrigating rivers but as fountains of life."⁹ Duality to the message of Muir is frequently noted. Preserving water sheds and scenic beauty may be related activities and this relatedness may be misconstrued as two distinct interests on the part of Muir. If one reads carefully and endeavors to

discern the basic motivations of John Muir, he sees that his values rise from the mystic side of his nature rather than a regard of materialism. His impassioned and supreme plea for the primeval forests of the high Sierras contains little earthy pragmatism.

Any fool can destroy trees. They cannot run away; and if they could, they would still be destroyed, chased, and hunted down as long as fun or a dollar could be got out of their bark hides, branching horns, or magnificent bole backbones. . . . Through all the wonderful, eventful centuries God has cared for these trees . . . but He cannot save them from fools.¹⁰

The teleological views of Agassiz, Marsh, Muir and the others spring from the wells of mysticism. . . . If undue emphasis has been given to these concepts and the men who defended them, it was done so in the belief that from this source comes a small but hard, persistent, and avid core of conservationists who comprise one of the two important divisions of the conservation movement. To understand the problems of conservation, whether in the past, present, or future, the student cannot overlook the nature, the interests, the quality of feeling that supports the concept that the world is a thing of beauty.

Our national interest during the nineteenth century was in winning the West; to conquer the space and to overcome the handicaps of labor shortage prompted the actions of public and private enterprise. This was a land of unlimited resources, so they thought; it was too much land, too much timber, too much grass, too much water. Thus the resources of the earth were lavished to compensate in part for labor and capital. In this world there was no place for such a word as material conservation or restraint. It was this ruthlessness that aroused the righteous indignation of the nature lover.

Eventually the space was nearly subdued. What remained of the public domain was land of doubtful value. The farmer could no longer jump from one exhausted farm to the other; forests became assets; "unlimited resources" was no longer the watchword. The resources were getting less; skills and knowledge increased; capital equipment expanded, immigration increased, and the role of labor and capital assumed greater prominence as factors of production. It was upon this stage that a President and a forester made an entrance—Theodore Roosevelt and Gifford Pinchot.

The Roosevelt-Pinchot Era

It is difficult to ascertain just where the roots of material conservation extend and when the concepts were first conceived. To identify all the early contributors to the movement is impossible; some notable names are intentionally omitted in the process of generalization while other great personalities have long since been forgotten in the peculiarly selective processes of history. The names of Franklin, Washington, Jefferson, Adams and others are sometimes identified with the early movement. The wisdom of these men was expressed in their efforts to set aside tracts of forest lands for future use. Later in the nineteenth century there were many congressional acts that had to do with the ownership and control of the earth's resources, for example, the Homestead Act of 1862, the Minerals Land Act of 1872 and the Timber and Stone

Act of 1878. There is not, however, in the commendable actions of our forefathers or the congressional legislation of the nineteenth century a national policy regarding earth resources.

It was the forests, more than any other one factor that precipitated the national conservation program as we generally envision it. Forest destruction was obvious; every citizen could see the expanding stump land and many of them felt the economic pinch associated with depletion. In 1873 a memorial was presented to the Congress by the America Association for the Advancement of Science in defence of forest preservation. A second memorial was prepared in 1890 and the Forestry Bureau was set up in the Department of Agriculture. The next year the Forest Service Act was passed and the first National Forest in Yellowstone was withdrawn from the public domain.

The temporary retreat of *laissez-faire*, the passing of the frontier, the absence of a national resource policy, the tangibility of forest depletion, and the presence of men with ideas and convictions prepared the way for a national policy and the launching of a program of conservation that has never been surpassed before or since.

Pinchot and the Concept of Use. Just as John Muir symbolized the thought that the earth is beautiful, so might Gifford Pinchot symbolize the idea that the earth is useful. The conservation movement has roots in both. In the minds of many students, Pinchot* and Theodore Roosevelt rightly hold first place among the men who promoted the conservation movement in the United States, in fact, in Pinchot's mind the movement had its inception on a winter's day in 1907. *The defenders of John Muir criticized Pinchot for assuming such a role, for to them it was Secretary Noble of the Department of the Interior who was responsible for the legislation which created the forest reserves and accordingly this act marked the beginning of conservation.

"This is how it happened . . . in plain words a man by the name of Pinchot was riding a horse by the name of Him on the Ridge Road in Rock Creek Park near Washington. And while he rode, he thought. He was a forester, and he was taking his problems with him on that winter day of November the 7th, when he meant to leave them behind.

"The forest and its relations to streams and inland navigation, the water power and flood control to the soil and its erosion; to coal and oil and other minerals; to fish and game . . . what had all these to do with forestry?

"Here were not isolated and separate problems. My work had brought me into touch with all of them. But what was the basic link between them?

"Suddenly the idea flashed through my head that there was a unity in this complication . . . that the relation of one resource to another was not the end of the story. Here were no longer a lot of

different, independent, and often antagonistic questions, each on its own separate little island. . . . In place of them, there was one single question with many parts. Seen in this light, all these separate questions fitted into and made up the one central problem of **the use of the earth for the good of man.**"¹¹

Here is the keynote of the Pinchot program—**the use of the earth for the good of man!**

The principles of conservation that Pinchot outlined were as follows:

1. **Wisely to use**, protect, preserve, and renew the natural resources of the earth.
2. To **control the** use of the natural resources and their products in the common interest, and to secure their distribution to the people at fair and reasonable charges for goods and services.
3. To see to it that the **rights of the people** to govern themselves shall not be controlled by great monopolies through their power over natural resources.¹²

No one can take issue with the universal attraction of these principles, especially the first two, with emphasis upon wise use and controlled use. The issues are sharpened somewhat more with regard to the third, and yet it was the sharpened edge of this principle that drove the wedge deeply between what appeared to Pinchot to be good and evil—the defenders of the interests of the common man against the greed of the few wealthy and powerful.

Conservation and the Progressive Party: The Progressive Party, under the leadership of Theodore Roosevelt, was not necessarily anti-big business, perhaps less so than the events of the time might suggest. But Pinchot was successful in the formative period of the movement to incorporate the doctrine of use for the benefit of the many in the platform of the Party, and this principle provided the energy and appeal. It was the materialistic, liberal doctrine that Pinchot so nobly embodies; to him all the things of the earth were designed for one purpose—use by man. The only restraint was on recklessness and waste. In his serious clash of ideas with John Muir as to the proper use of the federal range land, he expresses the true current motivation.

"Great stretches of open forest contain much feed that should not be wasted. . . . Sheep had to come, not only because it was fair, but also because the full use of the range required it."¹³

Pinchot was inclined to be conceited, but he was a man of ability and character; he made conservation the message of his chief's administration and despite his arrogance he sincerely recognized his chief's contribution.

"Lest you may think I have given myself too large a share in Theodore Roosevelt's great service to America, let me set the matter right.

"Among lesser people the allotment of credit for decisions of work done is often complicated and difficult. In the case of authority of last

resort, such as the President, the rule is simple. The President is personally responsible for every decision he makes, every order he gives, every speech he delivers. Who wrote the speech, who advised the order, who suggested the decision has nothing to do with the price of 'butter'."¹⁴

And even more effectively in these words:

"I hope that I have made it sufficiently plain that the conservation policy originated in the administration of Theodore Roosevelt, that it was presented to the American people by him and that it was accepted by the American people while he was President and largely because of him."¹⁵

White House Conference: Although Pinchot's interest in conservation was initiated by a concern for the proper management of the forests, he soon sensed the relationship between forests and other resources, particularly water, and finally included within the scope of his concern all natural resources that were characterized by their limited nature. The close and obvious relationship between forest and water resources prompted President Theodore Roosevelt, with the assistance of Pinchot, to appoint a nine-man Inland Waterways Commission in March, 1907, and out of the activities and concerns of the Commission came the White House Conference which assembled May 13, 1908.

To the Convention came the President, Vice-President, members of the Cabinet, Supreme Court, and Congress, governors and their representatives, the representatives of 68 national societies, and the members of the Inland Waterways Commission. The convention was unique; this was the first time in the history of the United States that the governors as a group had ever been assembled to consider a national problem and to establish a national policy; never before had scientists and politicians assembled with equal status to grapple with a common problem. It was an impressive gathering; the President's opening address reflected insight, perception, and a conviction projected against the backdrop of 25 years of development.

The mandate given the President by the governors resulted in the appointment of forty-nine well-known men from politics, industry, and science to a National Conservation Commission with Gifford Pinchot as chairman. Under the leadership of this Commission, forty-one state commissions were organized and an inventory of the natural resources of the nation was made and presented to the President in January, 1909.

The tempo of the movement continued and the horizons expanded. President Roosevelt invited the governors of Canada, Newfoundland, and the President of Mexico to meet with the Conservation Commission of the United States in Washington on February 18, 1909. And on February 16, 1909, Roosevelt recommended an international meeting at the Hague to consider the resources of the entire globe. Never in the history of conservation did the tide run so high or so favorably.

Retreat of the Conservation Program. The retreat of National Conservation Program was about as rapid as the rise. The depletion of the forests continued

unabated, and the menace of soil erosion persisted without significant change until the 1930's. What was responsible for the ebb? Why did it fray out so quickly? One obvious reason is that the Sixtieth Congress failed to appropriate the funds necessary to keep the movement alive. But actually there are other and more important factors to be considered in the scene of the retreat.

If over-enthusiasm may be labeled as a negative quality, then the movement was carried always by self-generated enthusiasm. Under such pressure, assertions were made that figures and events of ensuing decades did not support. Forests recovered faster than they believed, soil erosion did not produce famine, and the estimates of mineral reserve increased immeasurably. Pinchot had underestimated technological advances and overestimated the scientific learning of his time.

Changes in national attitudes require time and education, more so than the rapid rise and fall of political campaigns. This is especially true when the very fundamentals of jurisprudence seem to resist conservation. In American law there is a noteworthy tendency to defend the inviolability of private property. As Zimmermann puts it, "Behind these basic ideas lurk the surviving philosophy which owes more to Bentham than to Blackstone and which as successfully resisted the efforts of a decade of economic, social and technical change."¹⁶ Although the Roosevelt-Pinchot campaign was intense and to a great degree successful, it failed to leave many scars on the physiognomy of private enterprise; big business was truly big, well-entrenched, supported by jurisprudence and a tradition of *laissez-faire* that does not scar easily.

Other serious weaknesses are found at the very roots of the movement itself. The equalitarian principles were sweeping and noble, but they left in their wake a host of unanswered questions. For example, Pinchot's noted utilitarian formula of conservation as the "greatest good for the greatest number for the longest time" is a stirring adage and, although it states a proper need, it fails to provide a way of achievement. The question as to how the natural wealth of the nation is to be equitably distributed still remains unanswered. The "multiple-use" concept that was enunciated later was prompted by a need for a method of approach. This concept has become the guiding theme whereby the U.S. Forest Service, and more recently, the Reclamation Bureau, assume to assign in the interest of the public the highest proper use and value to the earth's resources. The concepts assume, however, that a balance of interest is actually possible and, furthermore, that there is some device whereby the proper assignments may be made. McConnell points out that to award the highest use would require no more than honesty, **if the highest use were known.**¹⁷

There was a failure on the part of the Pinchot-Roosevelt movement to recognize that resistances are inevitable whenever resource utilization is concerned; it is as logical as supply and demand, profit and loss, producer and consumer, city and country. Any resolution of a problem is seldom to the complete satisfaction of all groups, thus challenge is the rule.¹⁸

As more and more of the public domain was placed beyond exploitation by private interests, the problem of resource planning became increasingly

critical. The simple formula of the greatest good for the greatest number does not offer any suggestion for resource management, neither does the multiple-use principle. Resource planning was inevitable in the philosophy of conservation as introduced by Roosevelt and Pinchot, but no program was created whereby the decisions might be made. What criteria are there for deciding on either the rate of use or the distribution of use?¹⁹ The duty to plan is clear, but the wisdom necessary to perform the duty is something else.

In the late twenties Garrett looked back at the conservation events since the White House Conference in 1908 and summarized the scene as he saw it at the quarter century:

"Twenty years have passed and it has not yet come. Holding to the American tradition of the pioneer's right to possess what he finds and to exploit it as he pleases, wastefully or efficiently, the individual is still a powerful political influence . . . Behind him is the will of states and communities to exploit land and all natural resources within their reach. It is their shortest way to self-aggrandizement. Land, forest, and minerals are national assets, but farming, lumbering, and mining are regional activities on which to build vital statistics, taxable wealth, concrete roads, cities, commerce, banking, State power."²⁰

The Post-Theodore Roosevelt Period

The post-Roosevelt period covers an interval of approximately fifty years and during the interim "America transformed itself"²¹ from the big business of the Carnegie-Morgan style to managed corporations; from topheavy plutocracy to bureaucracy; from a Monroe doctrine to a Truman doctrine. A national policy regarding resources was an innovation of the Roosevelt period but since then the policies have fluctuated between the concepts of private and public regulation. Each of these changes has its implication in resource use. The Coolidge-Hoover stand and the New Deal era have been selected for the post-Theodore Roosevelt period as administrations in which rather well-defined patterns of conservation can be identified.

Conservation Under Coolidge and Hoover: A hurried reconnaissance of conservation during the first quarter of the twentieth century frequently misses the Coolidge-Hoover period as contributing to the conservation movement. It was indeed different; the interim was characterized by a caution that was drab in contrast with the color of the Pinchot-Roosevelt campaign. During the twenties, conservation was a word used by sober businessmen whose actions were supported by the cold calculations of engineers; it was concerned with the "black gold" of the subsurface where depletion was not so conspicuous and much more conjectural than the depletion of the more tangible forests. The forces responsible for channelling the conservation thought of this period were: an economic philosophy, war, airplanes, and an unprecedented boom in petroleum production with an associated waste. After World War I, a number of geologists in government positions advocated oil conservation. They could see the dawning of an air age and its role in national defense; they plotted petroleum reserves against production and the extended curves were getting ever

closer together. The petroleum industry scoffed at the idea of depletion and conservation. Strangely enough, subsequent events proved the warning of the government prophets inaccurate. Shortly thereafter rising prices and the magic wand of technology turned the industry in a plethora.

In the late middle twenties the powerful elements of the oil industry could see ominous signs. The waste of petroleum and gas in the unbridled competition of this period was not profitable; furthermore, it focused the attention of the adherents of governmental regulation upon industry. Thus, the American Institute of Petroleum inscribed its own banner of conservation and implored the government to review the entire problem.

In December, 1924, President Calvin Coolidge addressed a letter to the Secretaries of War, Navy, Interior, and Commerce, in which he appointed them to serve as a Federal Oil Conservation Board. The letter spelled out clearly the needs that prompted the action and the method whereby the needs could best be served. It reads in part:

"It is evident that the present method of capturing our oil deposits is wasteful Developing aircraft indicates that our national defense must be supplemented, if not dominated, by aviation."²²

The method of attack as outlined in the letter was:

"To study the government's responsibility and to enlist the full cooperation of representatives of the oil industry in the investigation Government and business can well join forces to work out this problem of practical conservation."²³

The Board followed the President's admonition and government and business did join forces to cope with the petroleum problem.

Seven reports were submitted by the Federal Oil Conservation Board to the Presidents during the interim of 1926-32. The essence of these reports portrays most effectively an aspect of resource-use that may not appear under the heading of "conservation" but regardless of terms the attitudes of this era exemplified private enterprise rallying around the concept of more efficient use of resources. This concept they held in common with the Pinchot school of thought, but differing sharply on the issues as to who writes the rules for managing the resources.

The Board concluded after reviewing the testimony of many witnesses that "major part of the measures that must be taken to protect our future supplies (of petroleum) must rest upon the normal commercial initiative of private enterprise."²⁴ There is no question in such a statement as to who sets the policy.

The rights of the state to police and prevent the action of one owner from encroaching upon the rights of another owner were reaffirmed. Furthermore, the report endorsed the state's right to prevent waste of natural resources and to enact legislation when it was deemed necessary. The Federal government's power to regulate oil production was limited to its own oil lands. This aspect

of the report served the industrialists two ways: (1) there would be a degree of regulation that would free the owners from extreme competition and thereby relieve the glut, and (2) the legislation would be shaped locally and would therefore serve the producer's needs best.²⁵

The short-lived era is singular since it breaks with the Roosevelt-Pinchot and the New Deal theme that conservation is a governmental function. Here was a pattern of thought that believed in utilization of resources and entrusting the conservation of these resources to private enterprise. These strands of thought root deeply in the American tradition of rugged individualism, freedom, and the sacredness of private endeavor.

The New Deal Era: Just as the forest served as the critical material witness for the Roosevelt-Pinchot conservation program, and petroleum for the Coolidge-Hoover period, so the conservation of soil is the keynote for the beginning of the New Deal. The devastating impact of the Great Depression associated with an untimely drought was experienced in the nation with penetrating acuteness. Peoples in all avenues of life were thrown back by the scourges of the thirties but none more seriously than the farmer. The New Deal moved immediately to the aid of the under-dogs and a soil conservation program was activated.

The basic doctrines of conservation as Pinchot expounded them were either carried forward or revitalized in 1932 when the New Deal program rose to meet the challenge of soil erosion and economic collapse. The difference between the Roosevelt-Pinchot theme of conservation and the Roosevelt-Truman policy was largely one of degree rather than basic philosophy. In many ways, however, the New Deal recast the pattern of thought with certain features receiving deeper impression in the mould. Faith in the *laissez-faire* business leadership, that had dominated the scene during the Coolidge-Hoover administration, waned; stagnation of the economy in the early thirties was evidence that public welfare was not an automatic result of the relentless pursuit of individual interest. A much greater emphasis was placed upon governmental control during the New Deal than in the earlier movement. Although Pinchot was thoroughly converted to the doctrine that unregulated private enterprise and monopoly were the sources of many of the economic, political, and social evils which afflict mankind, the political party at the time was not completely sold.

Interest in ecological balance was a reawakened theme during the New Deal period. The ideas date back to Muir and Marsh and the message resembled very much the Malthus rule of "breeding against the means of sustenance." Malthus was a prophet of the period prior to the mechanical revolution, therefore, neither he nor his aides dreamed of what is already reality, namely, man's control over vast supplies of inanimate energy. The world at the time of Malthus was a vegetable civilization with a vicious cycle of resource use.

As the great new powers of steam, gasoline, diesel, electricity, nuclear energy unfolded, Malthus became obsolete. There followed a shift from extreme pessimism to the opposite: a faith in bonanza, in unlimited resources provided by science and technology. Today, it is a machine civilization, the vicious cycle has been broken and the spiral ascends. Man utilized the land to create the capital and give birth to a billion robots that do man's bidding—building cities,

designing jets, splitting atoms, which in turn gives man a higher standard of living, with leisure, aids, and safety. The spiral rises, and as it rises higher, it thins, and becomes exposed to high winds. "It is a bold structure, but the towering height is not without its risks."²⁶ It was this concern during the twenties that evoked East in his **Mankind at the Crossroads** and Ross with **Standing Room Only** to warn us that we may be headed for a new catastrophe. During the thirties, a number of publications appeared and across the pages of these works can be felt the wind, dust and economic desolation of the Great Depression. Sears' **Deserts on the March**, Bennett's **Soil Conservation**, and Chase's **Rich Land, Poor Land** are indeed classics of the period. It seems that the crescendo was reached in the forties when Osborn's **Our Plundered Planet** and Vogt's **Road to Survival** hit the "best seller" list.²⁷

Osborn and Vogt are natural scientists and therefore prone to be less interested in the economic and political superstructure. To view the world through the eyes of these men is to view the world as ecologists and note the lack of a sane ecological balance between man and land and to conclude that man lives by destroying the bases upon which his life depends. The theme returns to the work of Marsh and Muir wherein they treat with equal evangelistic zeal the disturbing impact of man upon the earth. The difference between the messages of Vogt and Osborn and that of Marsh and Muir is one of a greater perspective born of the advantage of time and the sharpening of the issues as a result of the heightening of the spire. Retaliatory articles were written in response ²⁸ to the advocates of ecological balance and rebuttal is in order, but regardless of the claims and counterclaims the fact of importance to this paper is that the books serve as instruments in arousing and maintaining the ideas of ecological balance and harmony in nature as advocated by Muir.

A sense of social responsibility on the part of governmental agencies and

private enterprise was stimulated during the period. The social awareness of politicians and corporate managers may be the most important single feature of the present era with tremendous ramifications in the future. It has been described as a form of "enlightened selfishness"; the bearing of the program on future resource adequacies can hardly be realized. The expressions are seen in the "bold, new program" inaugurated by President Truman or the efforts of Nelson Rockefeller to improve the health, education, and economy of the Latin American countries. This is the very epitome of Pinchot's concept of intense resource use for the betterment of mankind and, more significantly, its shadows suggest a merging of divergent opinions as to proper resource management; a program of combining the genuine advantages of overnment responsibility and private initiative.

Prospect

Most of the patterns of thought and action that we observe today will be carried forward into the future. The momentum of current action associated with the inertia of the status quo will keep the bulk of the pattern moving forward—unchanged. Programs will continue to be motivated by those who see a material utility and by those who see the unifying God principle in all things above, below, and on the earth. The original thesis of this study presents the idea that through all historic time there have been priests and prophets—Pinchots and

Muir. This fundamental difference of opinion will persist in the future, sometimes in cooperation when the areas of interest are held in common; sometimes in peaceful co-existence; and sometimes in open conflict. The ingredients, however, of change, expansion, intensification within these two frames of reference are inherent. And it is the purpose of these concluding pages of the study to discern if possible what these ingredients may be and what they portend for the future.

Resources for the Future, Inc., and The Conservation Foundation are two relatively new organizations that have been selected in this study as exemplary of contemporary interests and future trends in conservation.* A scrutiny of the objectives of the organizations and a study of the projects supported and anticipated by them have been assumed to be indicative of trends which may be shaping the patterns of conservation thought for tomorrow. The themes of the future cannot all be easily departmentalized, but in general the measured beat of Pinchot's call for wise use and regulated use is most audible in nearly every quarter; the isolated and clear call of Muir for balance and harmony in the preservation of the beautiful world never fails to appear.

Resource Use. Pertinent aspects of conservation of the future will be in the realms of water resources, energy resources, and land-use and management. The field of water resources development is one of the most complex and challenging problems confronting the student of conservation. The research of the future will be directed toward the problems of coordination and cooperation, more effective means of educating the water users to the problem, the improvement in state and government organizations that have to do with water resources, and the investigation of the methods of financing publically instigated water projects.²⁹

The field of energy resources also encompasses a broad facet of activities and problems. Fragmentation by both private and public agencies has been the rule in the past regarding energy resources. Policies have developed as a crazy-quilt pattern with each commodity carrying its own peculiar policy. Even today as nuclear energy emerges, another agency is established to deal with this single energy source. The most pressing problem for the future will be to take the comprehensive view of the whole range of energy resources.³⁰

Land-use and management problems may appear to be of an everyday caliber, as far as the layman is concerned, but the importance of this area of conservation is not a function of familiarity. The tremendous amount of land-use research of the past has been concerned largely with production of farm lands. Much of these data remain unassembled and unrelated to other efforts. Research concerned with non-farm land is even more fragmented. Thus the obvious research of the future will be in synthesizing the details of land-use

*The Conservation Foundation was established in 1948 as the first non-profit organization designed to carry out a balanced program of research and education in the field of natural resources. Resources for the Future, Inc. is also a non-profit corporation founded in 1952 with the cooperation of the Ford Foundation, and whose avowed purpose is to improve the development, conservation, and use of natural resources through programs of research and education.

into broader generalization. More specifically the research will be directed to land other than farm land.

"Forestry economics is at least twenty years behind agriculture economics; problems of recreation and wild-life management have been studied even less. Public lands administration is another field that might benefit from objective study. The economics of watershed management for the purpose of influencing water yield and stream flow is virtually an unexplored wilderness demanding the dual attention of land and water research workers."³¹

The basic research in the natural sciences which is now supported by government, industry, and universities will be undoubtedly continued on an expanded plane. But in the future conservation research will be oriented more and more to the social sciences. This will be particularly true along the periphery of thought where answers within a new frame of reference may be sought. The emphasis will be an economic and social interpretation of resource situations. The relationships between separate trends, and between these trends and the general economy, await investigation. Research along these lines is generally through the utilization of the methods of the social scientists.³²

Such are the problems of the future confronting the followers of Pinchot in their efforts to determine more efficient use of the earth's resources.

Ecological Balance: If the program of the Conservation Foundation is indicative of things to come, one can expect to find in the future, research that will be directed to an intensive consideration of the resource-population problem. In the Annual Report for 1955, The Conservation Foundation opens as follows:

"The year (1955) has been remarkable for the increasing amount of consideration given natural resources and population problems in various parts of the world. Episodes have occurred in many different countries that reflect, among other things, a basic questioning as to whether present scientific, industrial, and agricultural programs, remarkable as much of it is, can take care of the world's needs. To be sure, the promises of scientific discovery and technological advances are more widely publicised and admired than ever before, yet there is a growing sense of doubt and even insecurity"³³

This concern is by no means new, but the temper of interest has been sparked by the extraordinary up-trend in human population in both industrial nations and under-developed regions of the earth. Projected against this curve of human numbers is the knowledge that modern civilization is consuming each year increasing quantities of raw materials. Can these trends go on forever? How nearly attainable is a balance between world population and world resources? If attainable, how can it be maintained? What does man really want and need in the society of the future? How should he define his relationship to the earth in order to fulfill his material and spiritual aspirations? These and similar provocations are the pregnant questions for the disciples of John Muir.

Few things are harder to put in order than the life and thought of one's own day. Just where do we stand in the stream of conservation events? Are

we entering a period of insight? Are we still grappling in a period of uncertainty? The thinking and activities of the two Foundations suggest that there is a semblance of a threshold of change, an expression of a desire to consolidate the gains, "to separate out the many factors of complex problems and evaluate their significance."³⁴ There is a "sobriety" about the motivations of the agencies that presages an era of insight ahead. Horace M. Albright expresses this attitude very effectively:

"Resources for the Future is based upon a very simple idea: the more people know about the problems they are up against, the better they are likely to make out. A generation ago, this proposition might have been stated even more flatly: more knowledge **will** bring greater progress and prosperity. Today, with the fresh memories of the last war tyrannies and troubles over much of the world, it seems wiser to make some allowance for human errors and limitations and to conceive that decency and reason do not always of themselves prevail. But the basic truth of our proposition stands, whatever else may be needed, more facts and better understanding are as important as ever."³⁵

And how will it fare with the priests and the prophets—the Pinchots and the Muirs of the future? Zimmermann poses a penetrating question:

"What is better, a primeval forest of well-nigh unlimited timber stands, without steam engines and circular saws and high-speed tools and mechanical logging devices; or a forest half the size, plus a highly developed knowledge of how best to use and exploit the supply of timber and a highly advanced stage of the arts to which this knowledge can be applied?"³⁶

The reply seems quite obvious—a little forest and a lot of culture. But is the answer actually so simple? In the first place, the defense of the philosophy of a "little forest used and a lot of culture created" is predicated upon the idea that tangible natural resources can be substituted for the intangible cultural resources. Thus far, however, in the process of substitution the increased knowledge and improved arts have resulted in increased numbers of consumers with redoubled appetites drawing upon a reduced supply. This cultural progress cannot be accepted as a substitute for conservation.

In the second place there is a subtle miscalculation of underestimating the size and the strength of a dedicated group who would sincerely prefer to have more primeval forest with less of the debris of cultural progress. In the writer's opinion the adherents to Muir are more numerous than the evidence of research and avowed objectives would suggest. This has been an age of priests, the future may discover prophets.

Upon John Muir's death his score was even; his cause had won the Yosemite National Forest case but had lost the Hetch Hetchy when a dam was placed in Yosemite Park to supply power for San Francisco. Today the advantage has been regained for it was Muir's cause that won the struggle over the Echo Park Dam on the Upper Colorado River. The Hetch Hetchy proved to be a prototype of the Echo Park. The defenders of the Echo Park Dam have criticized

the Sierra Club and other movements for playing the role of puppets in the hands of Southern California interests. Wallace Stegner, the novelist and historian, writes in his defense of Echo Park:

"How much wilderness do the wilderness lovers want? The answer is easy. Enough so that there will be in the years ahead, a little relief, a little quiet, a little relaxation, for any of our increasing millions who need and want it. That means we need as much wilderness as still can be saved. There isn't much left, and there is no more where the old open space came from.

"... If we preserved as parks only those places that have no economic possibilities, we would have no parks. And in the decade to come, it will not be only the buffalo and the trumpeter swan who need sanctuaries. Our own species is going to need them too. It needs them now."²⁷

Whether Stegner played the role of a puppet or not is unimportant. But the fact that there was a nation-wide response to the defense of the wilderness area of Echo Park Dam is highly significant.

Thus the tides run—sometimes more favorable to one idea, sometimes to the other, but in the end, perhaps, to the advantage of all. If the preceding essay has led to any conclusion, it is the **constancy of the ebb and flow of conservation concepts**; and in the restlessness of this sea of thought, man appears as a responsible agent. Thus conservation of the future will involve ideas and convictions more than the problems posed by nature.

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CULTURE AND THE IDEA OF NATURE

Clarence J. Glacken

University of California, Berkeley

Generations of modern scientists have tried to understand the processes of nature as revealed—not in the whole creation—but in the living and inert matter appearing in the countless variety of landscapes on earth. Students of man have made equally great efforts to understand human society by observing the evidence of historical records or of archeological discovery. The most puzzling questions have arisen when attempts have been made to discover relationships existing between human cultures and the natural environment. In modern times, conceptions of these relationships have been influenced by the idea of nature which has been widely accepted by the scientific thinking of an age.

Since the seventeenth century ideas of nature and of man's relationship to it have changed greatly, although a continuity of thought from that time to the present is clearly discernible. The dominant theme among the seventeenth and eighteenth century thinkers was that nature, of which man and his works were a part, was an all-embracing harmony. In the nineteenth century this unity of thought was lost and various interpretations of nature replaced it; some thinkers emphasized the struggle for existence, others the complex interrelationships in nature, still others the modifications of nature made by human activities. In our own times, the idea of conscious control of nature through science and the idea of nature as a delicately poised balance which is easily disturbed by human interferences have been widely used in general discussions of cultural and environmental change.

Seventeenth and Eighteenth Century Thought

Toward the end of the seventeenth century the dominant conception of nature—and the one which has been emphasized in histories of science—was the mechanistic view which owed its widespread acceptance to the prestige of mathematics and to the scientific and philosophical works of men like Galileo, Descartes, and Newton: the universe of which the earth was a part was like a great machine. Nature owed its orderliness to an underlying mechanical order far removed from the bright and colorful beauties of external nature. A. N. Whitehead in a famous passage in **Science and the Modern World** thought this conception of nature to be characteristic of seventeenth century thought.¹ Whitehead's characterization applies however to only one segment of seventeenth century thought, for it neglects the scientists in natural history who, far from accepting the dismal implications of the mechanical view, emphasized—with the inspiration and prestige of an idea probably as old as Western civilization itself—that the earth was a divinely designed environment, fit for the living together of the countless variety of beings, from the simplest to the most complex organisms, which were widely distributed among the different environments of the earth. This idea, with its roots strong in Greek philosophy,

in the elaborations of the Stoic philosophers, and in Christian theology, and with an emphasis on anthropomorphism and teleology which later science was to find so distasteful, at least called forth (what the abstract mechanical view did not) an appreciation of the beauties of nature, and stimulated study of the inter-relationships existing in it, for by so doing one not only learned more about nature but found in these discoveries further evidences of the wisdom of God.

The works of the famous botanist John Ray are excellent examples of this point of view because they discuss in much greater detail than do other contemporary works the biological nature of the earth; they also bring out clearly conflicts in contemporary beliefs concerning the nature of the earth. Ray not only dismissed the mechanistic view which I have already described, but also the notion, revived from classical antiquity, that the earth was subject to decay and that the force and vigor of nature had declined from previous ages. In criticizing this notion, Ray and other contemporaries of like mind revealed the optimistic tone of their thinking: God would not create a world whose vigor declined with age; there was a constancy in nature, the result of the divine plan, upon which mankind could rely.

To these men, the areas occupied by human cultures were those parts of nature which had been changed by art; they were an expression of the cooperation of man with God in following His design by making pleasantly tilled fields out of wasteland or out of unsightly marshes.

To seek in nature the proofs of God's wisdom, said John Ray, was a task of "thinking God's thoughts after him." Here there was no warfare between science and theology; how could there be when each fresh discovery confirmed in greater and more accurate detail the truth of the great design?²

The idea of a designed earth, an earth that is the home and the nursery of mankind, was a commonplace in the geographical thought of the eighteenth and the nineteenth centuries. In 1767, Anton Buching wrote in the introduction to his eleven volume description of the countries and regions of the known world that the chief utility of geography was that through it one's perception of God as the creator and the preserver of all things was greatly deepened.³ The same idea appears in that great eighteenth century work of synthesis, Herder's **Outlines of the Philosophy of the History of Mankind**. It is of course the main theme of the philosophical writings of Carl Ritter. When his disciple, Arnold Guyot, told a Lowell Institute audience in Boston in 1847 that "it is correct to say that inorganic nature is made for organized nature, and the whole globe for man, as both are made for God, the origin and end of all things," he was reiterating a philosophy concerning man and the earth that would have been known and widely accepted from the time of Xenophon to his own.⁴

It was only a step from the seventeenth century conception to the one developed by the French naturalists of the eighteenth, of nature as a vast and complex harmony, with however less emphasis on the design of the creator, more on harmonies which were revealed in the beauties of the earth's landscapes. The best exposition of this conception is in the **Natural History** and in

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the **Epochs of Nature** of Buffon: man through art and skill is changing nature, but these changes occur within the harmony of the whole. Human cultures, Buffon said, had embellished nature by domesticating plants and animals, by cultivation and by drainage. If man occasionally destroyed too much, nature, endowed with its great reproductive powers, could restore the harmonies. Man appears like a monarch reigning over the princes of the blood, the commoners, and the colonials: he adjudicates and tempers the struggles in the plant and animal world and acts as a caretaker of nature.

The writings of Alexander von Humboldt carried the conception of a unity and harmony of nature even further; his work and that of his immediate predecessors like Captain Cook and George Forster, had made Western science much better acquainted with the tropics. His point of view is a distinct departure from that of Ritter, for von Humboldt was interested in demonstrating the unity and diversity of nature without pressing the teleological and anthropomorphic idea of the traditional philosophy.

The Nineteenth Century

In the nineteenth century, first the Lamarckian, then the Darwinian, theories of evolution effectively challenged the older teleological and anthropomorphic conception, superseding also in scientific interest ideas expressed by Buffon and von Humboldt. Although Lamarck emphasized the adaptation of life to its environment, it was the Darwinian theory of natural selection that carried the day. Organisms with an unlimited power to multiply, if uninterfered with, existed in a limited environment, a thesis which Darwin derived from the Malthusian principle of population: inevitably there was a new emphasis on competition in nature even though many pre-Darwinian thinkers had mentioned it.

Students of human society promptly applied this interpretation of nature to human cultures; the competition of modern nation-states for trade and territory was interpreted as a struggle for living space in a limited world. The idea that cultural processes are like those observable in nature is common in the geographical writings of the late nineteenth century, particularly in the works of Ratzel, though it would be unfair to suggest that the idea of a struggle for existence in human society dominated his thought. Ratzel's idea of a battle for living space, however, was an important element in the later development of German geopolitical thought.

Another aspect of Darwin's thought, the conception of the web of life, was obscured in the bitter nineteenth century controversies over phylogeny. Like the earlier writers, Darwin pointed out that "plants and animals remote in the scale of nature are bound together by a web of complex relations."⁸ The web of life, like the struggle for existence, was a metaphorical expression, for both expressions were intended to convey the idea of intricate interrelationships which had evolved through time. The metaphor of the web, however, suggested interrelationships more than struggle and competition. This web of life concept is one of the historical roots of modern ecological thinking which in turn is the theoretical basis for many modern ideas relating to the conservation of renewable resources.

In retrospect, however, what is astonishing about the nineteenth century is the thoroughness of the study of environmental change brought about by human activities, and, one should hasten to add, the widespread failure to see the implications of these investigations—which were that nature could not be studied without considering the changes resulting from man's economic and cultural activities. An extensive literature on torrents, water control, deforestation, soil erosion, and agricultural practices came into being, a literature which in the aggregate constituted impressive evidence of the far-reaching influences of culture on nature. George Marsh and Nathaniel Shaler in America, John Croumbie Brown in England, Victor Hehn in Germany, Alexander Woeikof in Russia, and Vidal de la Blache in France, however, saw the implications of this new study: it is this awareness of the power of human cultures to change the physical environment which really cut away the underpinnings of the older environmentalism that saw human cultures as adaptations or responses to environmental conditions.

Thus, the nineteenth century left to the twentieth a rich legacy but the heirs could not be blamed if they became confused by the provisions of the will: the struggle for existence was applied to human society, the same environmental controls operating there as in nature. The web of life concept carried on the old tradition of a balanced and harmonious nature but the tendency was to apply it to a biological environment which excluded man, while the studies of environmental change by human activities suggested a certain fragility of nature at the mercy of cultural advance.

The Present Century

In our own times, prevailing ideas of nature and culture can be discussed with less assurance because these ideas vary with fields of knowledge which are isolated, at least to some degree, from one another; one cannot speak of a consensus of opinion held by scientists and humanists.

There are two broad views toward nature which I think can be discerned in contemporary thinking. The first of these is that man has now, through science, reached a high degree of purposive and conscious mastery of nature. Discovery and invention, through the application of the scientific method, can be made with desired goals in mind, whether these are in nuclear physics, genetics, or in agricultural chemistry. Although this mastery naturally might lead to the destruction of civilization, it also has given confidence to many that science can provide food for growing populations and prevent—even correct—damage from man-induced soil erosion and deforestation. This kind of control over nature is part of our concept of a modern culture, a sense of control which now is being disseminated, even more rapidly than in the past, throughout the world.

The second of these is that man has now, by incidental, unconscious, and haphazard activities interfered with the delicate and fragile balance of nature, that these interferences have been going on since prehistoric times and are cumulative, and that the habitability of the earth is threatened, especially with increasing technological power, population growth, and the world-wide demands for a higher standard of living. Nature, from this point of view, far from being

controlled, is being destroyed by the vast accumulation of interferences, some from highly industrialized and mechanized societies, others from simpler non-industrialized peoples. The fate of human culture thus becomes inextricably involved with the changes which have taken place and are occurring in the natural environment.

I will not attempt here to state the case for either one of these views, for my task is a more modest one. It is to point out that differences in attitudes toward great questions such as these can be understood better by studying the literature of the past than that of the present and that through study of the history of ideas in the sciences and social sciences we can discover how ideas have started and how they have changed from one generation to the next and how they have often been put to new and unsuspected uses. The cultures both of the past and the present indisputably have made and are making great changes in their physical environments; the student however does not make a catalogue of these changes, for that would be impossible and meaningless. He tries to interpret them within a framework of ideas which he has acquired.

It is important that he and his readers know with precision what these ideas are and their underlying presuppositions. Both the idea of control over nature through science and the idea of a balance of nature are part of the heritage of the past; in the first we see the progress of science, a product of the reasoning, experimentation, and inventiveness of man, in the second we see the balance of nature subject to human interferences. Do our interpretations differ depending upon whether we look at the progress of science or at the changes of the natural environment? I think they might. The first idea leads to an interpretation of history as a gradual divorcement from environmental controls, the second to an interpretation of increasingly active involvement with the natural environment.

Such investigations can reveal the nature of the new and old ideas which are used to create world views. Through such studies one can understand the interpretations of the historical experience of man which each generation creates anew for itself.

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THE GEOGRAPHIC DYNAMISM OF CALIFORNIA MARKET GARDENING

Howard F. Gregor

San Jose State College

Captain John Smith once said that geographical study without historical perspective "seemeth a Carkasse without motion, . . ." That thought is particularly appropriate in any consideration of California geography, particularly from the economic side. Rapid and continually shifting regional emphasis on economic activities has accompanied transformation of the landscape. The general historical sequence of economic landscapes in California is well known. Some of the more recent, and important, changes have been less studied. The geographic nature of California market gardening during both its earlier and later stages has been given only slight attention. Such study has usually come only as a small adjunct of the relatively more impressive truck gardening industry of the state.

Early History

The distribution pattern of market gardening in California was far different in the mid-1800's than now. Major centers concentrated in the San Francisco Bay Area and in the small, but more numerous, sections around the towns of the Sacramento and Stockton areas. A much smaller proportion of local demands was satisfied than now. Lack of interest in farming, unfamiliarity of easterners with the California climate, and the very recency of settlement all contributed to the small amount of local produce production in relation to the rapidly burgeoning population. Primary dependence for supplementary supplies during the gold rush period was on the Willamette and southern coastal valleys of Oregon.

Development of the industry in southern California was even more backward at this time. No large influxes of population stimulated production here. Although kitchen gardens and orchards were integral parts of the earliest ranchos, the variety and quality of products was low. Also contributing to the overall poor status of market gardening in the southern area (as well as the north, prior to the gold period) was social antipathy toward agricultural labor in general. Indians furnished most of the labor supply during Spanish and Mexican rule. It is interesting to note a similar, but more diluted, social hostility that exists today in California. Now it is the Mexican national and Mexican-American who contribute most of the field labor. Typical of the market gardening picture in southern California as late as 1872 is this commentary by a Ventura County newspaper:

" . . . Outrageous—There is no county on the face of the earth where vegetable can be produced more easily or abundantly than this; and yet our markets find it necessary to ship from San Francisco onions, cabbages, and many other kinds of vegetables. These are brought here by people who have the finest garden lands imaginable and for which vegetables they pay from five to nine cents per pound (!). A sad commentary on the industrial habits of the population."

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At the turn of century, the north-south contrast had already reversed itself (Fig. 1) with southern California replacing Oregon as the major source of supplementary fruits and vegetables for the northern section of the state. Market gardening production expanded rapidly in both sections of California, however. It was only that the rate of expansion in the south was much greater. Farming techniques also improved considerably. Meanwhile, truck farming—the supplying of eastern markets with fruits and vegetables—had become the dominating economy of the state.

Present Areal Pattern

The rising importance of both truck farming and market gardening make it difficult to sharply define the current areal boundaries between the two economies. Areal specialization, which capitalizes on the numerous small, but highly significant, local variations in the physical environment of the California lowlands, makes it unprofitable for a particular market gardening area to raise great quantities of all the fruits and vegetables the local urban area needs. There are extremes within this average, of course. An analysis of fruit and vegetable statistics shows such examples as the San Francisco Bay Area producing more lettuce for its needs than the contributions of either the Salinas or Imperial valleys, while all of the oranges for the Bay Area are obtained from the Los Angeles area and the San Joaquin Valley.

Many truck farmers also regularly send a portion of their produce to local markets as well, thus further adding to the problem of delimiting California market gardening areas. In addition, the relative prices of eastern and local markets at any one time determine whether a larger or smaller share of the truck farmer's harvest goes to California cities. The overwhelming dominance of the truck in intrastate produce transport contributes further to the fluidity of market gardening boundaries. Both the Los Angeles and San Francisco Bay areas depend more on the faster truck than any other fruit and vegetable market of comparable size in the country. Approximately 80 to 90 per cent of all fresh produce arriving at the two California markets comes by truck.

Notwithstanding these telling modifications, the traditional "local market orientation" principle of market gardening plays a major part in determining the location of such areas and their gross outlines. A study of fresh fruit and vegetable production for the two principal California urban markets shows that both the Los Angeles Lowlands and the San Francisco Bay Area lead all other state market gardening areas in satisfying their own needs.

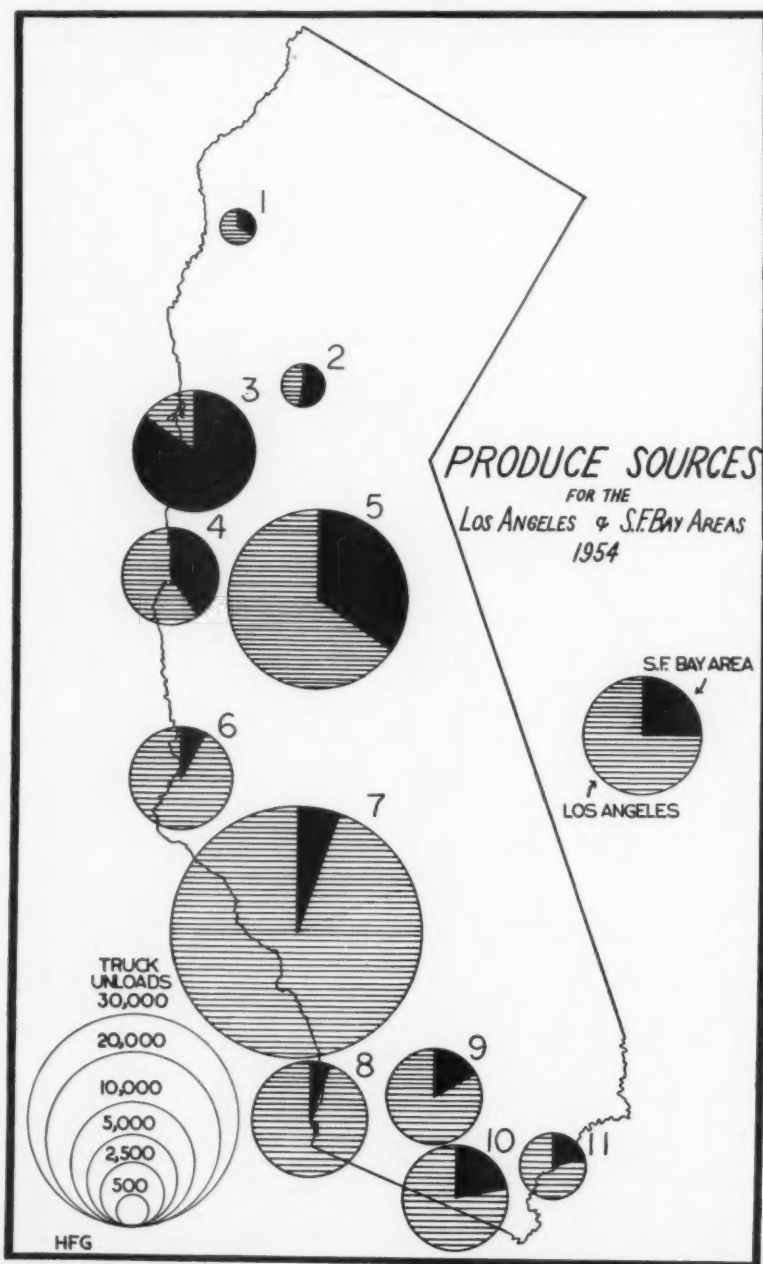


Fig. 1. Sources of Produce
For numbers, see Table, page 32

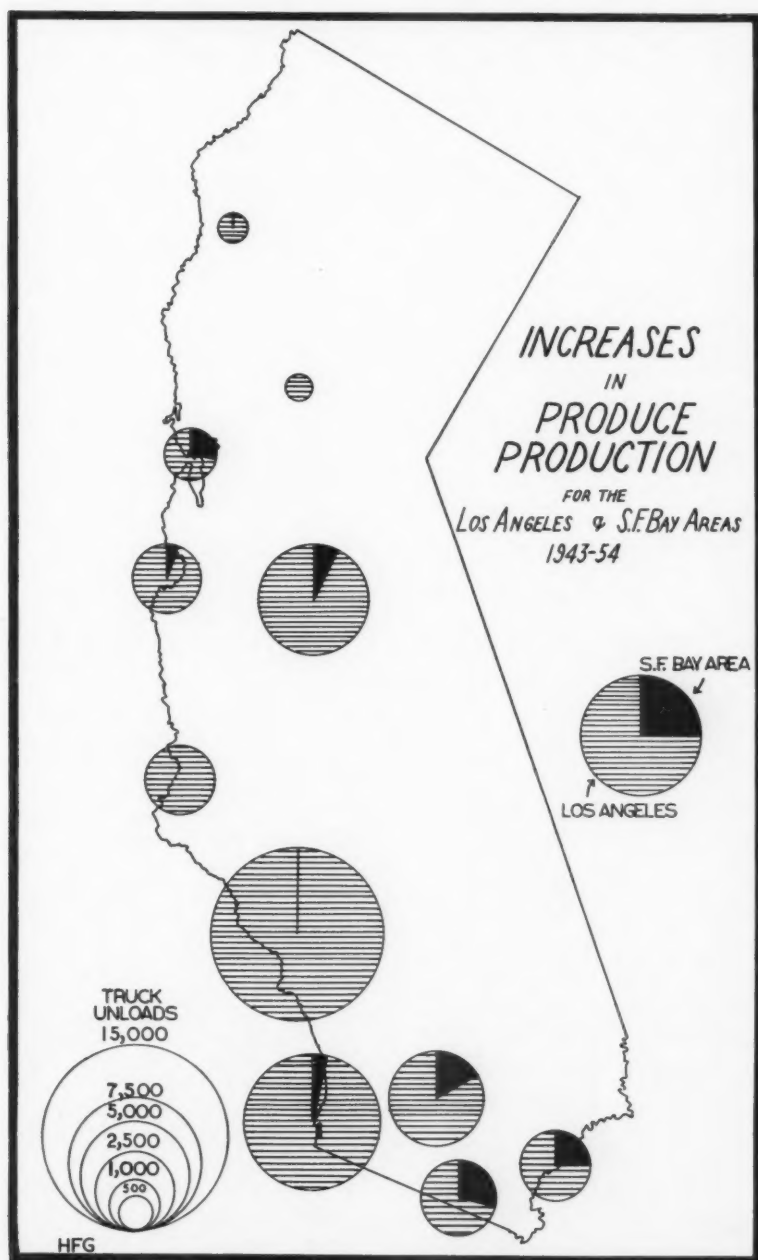


Fig. 2. Increases in Production

Fresh Fruit and Vegetable Production^a
for Los Angeles and San Francisco-Oakland, 1943-54
(Truck Unloads)

| Origin* | To L. A. | | To S. F. - O. | | Total | |
|-------------------------------|-----------|--------|---------------|--------|-----------|---------|
| Los Angeles Lowlands (7) | 30,335 | 43,773 | 2,387 | 2,404 | 32,722 | 46,177 |
| | 1943-1954 | | 1943-1954 | | 1943-1954 | |
| San Joaquin Valley (5) | 9,245 | 15,547 | 7,784 | 8,018 | 17,029 | 23,565 |
| San Diego Littoral (8) | 1,494 | 8,551 | 285 | 544 | 1,779 | 9,095 |
| S. Coastal Range Lowlands (6) | 4,676 | 6,617 | 556 | 545 | 5,232 | 7,162 |
| Imperial Valley (10) | 4,655 | 5,563 | 961 | 1,671 | 4,836 | 7,234 |
| Coachella Valley (9) | 1,651 | 4,898 | 343 | 982 | 1,994 | 5,880 |
| Salinas-Pajaro Valleys (4) | 1,835 | 3,637 | 2,346 | 2,442 | 4,181 | 6,079 |
| Palo Verde Valley (11) | 170 | 1,685 | 14 | 502 | 184 | 2,187 |
| San Francisco Bay Area (3) | 668 | 1,294 | 8,144 | 8,467 | 8,927 | 10,018 |
| Sacramento Valley (2) | 200 | 571 | 740 | 654 | 940 | 1,225 |
| N. Coastal Range Lowlands (1) | 170 | 517 | 218 | 223 | 388 | 740 |
| Total | 54,999 | 91,652 | 23,778 | 26,452 | 78,262 | 119,362 |

*Numbers in parentheses after areas of origin are keyed to map in Fig. 1.

Certain general shapes also characterize the predominantly market gardening areas of the state. Those of the Los Angeles and Bay areas, as well as San Diego, show the dictates of terrain. The two largest centers outline eccentric stellar patterns. In the Bay Area, the northern "point" includes the North Bay valleys of Santa Rosa, Sonoma, and Napa. To the east, lie the South Suisun Lowland and the San Ramon-Livermore valleys, and to the south, the major producing component, the Santa Clara Valley. Like the Bay Area, the Los Angeles Lowlands derive the largest share of their produce from the southern segment, namely, scattered sections in the southern part of the Los Angeles Basin and on the Santa Ana Plain. The San Gabriel Valley and San Bernardino and Perris plains to the east are next in production but have more potential because of their larger area. Completing the pattern to the north is the San Fernando Valley. The San Diego area exhibits a belt pattern, the arable area being closely restricted to the coast by the Santa Ana Block. The Central Valley market gardening patterns obviously tend more toward the circular.

The Role of Urban Expansion

Within these general areal patterns of market gardening, of course, are numerous temporal and permanent interruptions. The fluctuation of relative market prices, as noted above, contributes largely to the former, while areal crop specialization and urbanization are more responsible for the latter discontinuities. The current rapid rate of urbanization in California, particularly in the Los Angeles and Bay areas, appears to be an especially significant factor in both the current and future areal pattern developments of market gardening. That market gardening areas tend to expand in the same direction as the city, outward, is well known. Only recently, however, has serious attention been paid to the relative rates of expansion of the two units, a logical

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reaction to the increasing dilemma of expanding cities on one hand and the limited amount of lowland area and competition of more market-favored specialty crops on the other. Urban expansion is now surpassing increases in market gardening area of both the Bay Area and Los Angeles Basin. Urban outliers—smaller towns and cities and increasing numbers of widely scattered subdivisions beyond the expanding urban core—also are contributing to loss of market gardening land. The simultaneous peripheral expansion and core decrease of the market gardening lands is strikingly similar to the areal development pattern of urban blight in the built-up areas themselves.

This similarity is emphasized by the additional effect of expanding cities on **yield patterns**. It has been estimated that total vegetable production for California increased approximately 50 per cent during the period from 1937-39 to 1952-54, while vegetable acreage only expanded about 10 per cent for the same span.³ Such a development accounts for the fact that, despite the decrease of agricultural land in both Bay and Los Angeles areas, production expansions has reached record levels in both sections. But urban growth has also caused a decrease in yields. This occurs in the market gardening areas most immediate to expanding urban sections, and is largely a result of speculation. Such a stage is usually preceded by intensification and is itself a prelude to complete agricultural abandonment. "Zones of influence" has been the term applied to such areas of declining yield, since it is largely the increased taxes on all land in the vicinity of new urban developments that "influence" farmers to sell their land. In this light, it is the indiscriminate dispersal of new subdivisions ("shot-gun development") throughout the farm lands, rather than the main expanding urban core, that bodes most ill for future areal expansion of the California marketing gardening industry. The law of diminishing returns has perhaps more portent for the future of California agriculture as a whole than for any other comparably-sized farm region in the United States.

Modern Regional Production Trends

As the cities have expanded, "satellite" market gardening suppliers have become more important through both areal expansion and intensification (Fig. 2). Areal specialization and rapid transportation, already mentioned, also have helped. While the yield-acreage relationship tends to complicate comparisons, a review of California fresh fruit and vegetable production for the Los Angeles and San Francisco Bay markets shows that the two areas supplied 62 per cent of their needs in 1943 but less than half, 48 per cent, in 1954. During this period, the Los Angeles area increased its imports from the satellite sources at a greater rate than that of the Bay. The Bay Region still supplied in 1954 approximately the same proportion of its needs that it did in 1943: 34 per cent. Although the Los Angeles area still satisfies a greater proportion of its requirements than the Bay, it also is on the deficit side.

Intensification by the more rapidly urbanizing and mountain-girt coastal lowlands has offset to a large degree an interiorward shift in production. Excluding the North Costal Range Lowlands because of their much smaller area and rate of urbanization, the coastal areas produced 67 per cent of the Los Angeles and Bay area demands for fresh fruits and vegetables in 1954, only one per cent less than in 1943. About the same ratio applies to the two urban

areas individually. To be sure, some of the increasing deficit of market gardening lands around the two urban centers has been modified also to some degree by an expansion of acreage, largely at the expense of orchards and other specialty crops. Such a trend is particularly noticeable in the counties surrounding Los Angeles: Ventura, Orange, San Diego, Riverside, and San Bernardino.

From a resource point of view, it is of grave interest that the greatest amount of acreage expansion during the last fifteen years has ensued in the driest portions of the state. Spectacular percentage increases have been registered by the San Diego Littoral and the desert valleys of the Coachella, Imperial, and Palo Verde. Both the San Joaquin Valley and San Diego Littoral exceeded all other market gardening suppliers of Los Angeles and the Bay Area in absolute production increase for this period. The acme of resource strain and intensity seems to have been reached in the San Diego area. Within the last five years, the littoral has increased its supplies of fresh produce for the Los Angeles and Bay areas at a faster rate than any other region; yet, at the same time, the urban area recorded perhaps the largest percentage increase in population of any California city.

Despite the fact that the Los Angeles area exhibits a more notable trend toward dependence on other produce centers, the San Francisco Bay Region has shown a greater increase in relative dependence upon the desert valleys. Comparative distances and sizes of the two big markets help to explain why the Bay Area has obtained a greater proportion of the production increases in the desert than of the larger increases obtained by the Los Angeles Lowlands and the San Diego Littoral. In contrast is the puzzlingly small production increase of the Sacramento Valley, the smallest of any of the fresh produce suppliers. Undoubtedly, the competitive power of other specialty crops and governmental price supports play an important part in this apparent anomaly.

The Future

In spite of the fact that absolute increases in California market gardening production have been greatest in coastal areas, the trend is unmistakably toward the less densely populated interior, with all its attendant resource problems. A question also arises, "Will the time arrive when California shall cease to be a major producer of fruits and vegetables for the nation (i.e., truck farming) so as to be able to care for its own food demands?" If one economy is to be eventually eliminated, it will be that of market gardening, not truck farming, simply because of the strong competitive position—therefore greater profits—of certain California specialty crops on out-of-state markets. Such is the implied opinion of one expert.⁴

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3. Ralph I. Crane, "California Vegetable Industry," **California Agriculture**, X (May, 1956), 2.
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TWO ISOCHRONIC MAPS OF SETTLEMENT IN OREGON

Georgia Ellen Adams

University of Oregon

Following the examples of the Dodge¹ and the Zelinsky² isochronic studies of New England and Georgia respectively, I have attempted to analyze the settlement pattern of the state of Oregon.³ The importance of such a method for understanding the impact of settlement on the culture of this particular region is apparent when one realizes that even today Oregon has the major portion of population, political groupings and major industries in the Willamette valley, the area first settled by the pioneers.

In addition to cultural values pertaining to settlement, I have attempted to determine the extent to which natural barriers and routes of transportation have affected settlement frontiers, as well as to determine the nature of the flow of settlement in Oregon from one place to another.

There are few data in the many histories of Oregon that give specific historical settlement data for geographical locations in the state as a whole, though several have discussed settlement of the Willamette valley. In fact, there were many areas for which the data were so meager that these areas could not be adequately plotted on the accompanying maps.

The first map includes some 600 dates which were gleaned from various state, county and local histories. (See Fig. 1). These dates represent the first significant agricultural settlement for each area. As can be expected, there were few dates available for initial rural settlements. Land deeds were of little use in determining first settlements, as many of the pioneers failed to file a claim for from 5 to 20 years after settling on the land.

The second map was plotted entirely from Payne's study of post offices in Oregon.⁴ (See Fig. 2). This list contained some 2000 cities and towns, giving both the date of opening and closing for each. However, many of these were representative of towns no longer in existence and of the total number only 902 could be plotted for this study. This map was done separately to show the differential in this type of information from those given as historical dates, although Zelinsky suggested a postal study as a possible means of determining settlement patterns.

In order to interpret the accompanying maps, some of the historical and geographical features of the state will be included.

There are four principal mountain ranges and several minor ones in the state. The Cascade mountains and the Coast Range both run north and south through the entire state, and have acted as primary natural barriers to the advancing frontiers. The Siskiyou mountains are located in the southern quarter of western Oregon and the Blue mountains in the north eastern quarter. All are

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extremely rugged mountain chains, with the Coast Range being lower than are the other groups. The Cascade range divides Oregon into two distinct sections, western and eastern Oregon. Eastern Oregon consists largely of a high volcanic plateau, colder in winter, warmer in summer and considerably drier than the western part of the state. There are no great agricultural valleys in central Oregon, but in the far eastern section, the valleys of the Grande Ronde, Powder and Burnt rivers resemble those in western Oregon.

Among the distinctive features of western Oregon are the numerous valleys formed by the several mountain chains, the principal ones being the Willamette, Rogue and Umpqua valleys. The Willamette is by far the most attractive in all respects, being approximately 150 miles long and from 30-60 miles wide. It is the most thickly populated area in the state and is the best suited for varied agriculture. The Willamette River and its tributaries, along with that of the Columbia River, formed the major means of transportation for the early pioneers and at one time in the early pioneer history, a river steamer operated from the falls at Oregon City to the city of Eugene, a distance of almost 120 miles.

Historically speaking, the region was first entered by an American in 1792, when Capt. Robert Gray discovered and ascended the Columbia River, thereby forming the basis for the subsequent claims to, and acquisition of, the Oregon territory. Lewis and Clark first made known the great resources of the area in their official report. The first house was built in the state in 1810 by Capt. Winship, a New England seaman. In 1811, John J. Astor established his trading post at the present site of Astoria. In 1831, the first regular attempts at farming were made by retired Hudson Bay Company servants on the area known as French Prairie. Between 1834 and 1837 missionaries of various denominations arrived, bringing cattle, fruit trees and grain with them.

From 1816 to 1846 the territory was held in joint occupancy by Britain and the United States. In 1843, the first steps were taken to organize a provincial government, which was formally accepted in 1845 at a general election. In 1848, Congress recognized the Oregon Territory and the territory was admitted as a state 1859.

From 1842 to 1870, a considerable immigration of American took place, mainly from the slave border states and New England. By 1846 the white population totaled nearly 10,000. Settlement and development was greatly encouraged in 1850 by the passage of the Donation Land Claim law, which allowed emigrants 640 acres for married couples, or 320 acres for a single person. After December 1, 1850 these figures were cut in half. Indian uprisings had a considerable retarding effect on the frontier in the 50's and 60's, but by 1870 there were close to 100,000 settlers within the present limits of Oregon.

The difficulty of marketing the abundant agricultural products was, and is, a serious impediment to the economic progress of the state. The building of the railroads in 1870 and the gold rush of 1848-50 gave impetus to the growth and prosperity of the state. During the gold rush commerce boomed for the residents of Oregon, as they supplied much of the agricultural products and timber, at fabulous prices, to the miners, both in California and in Oregon.

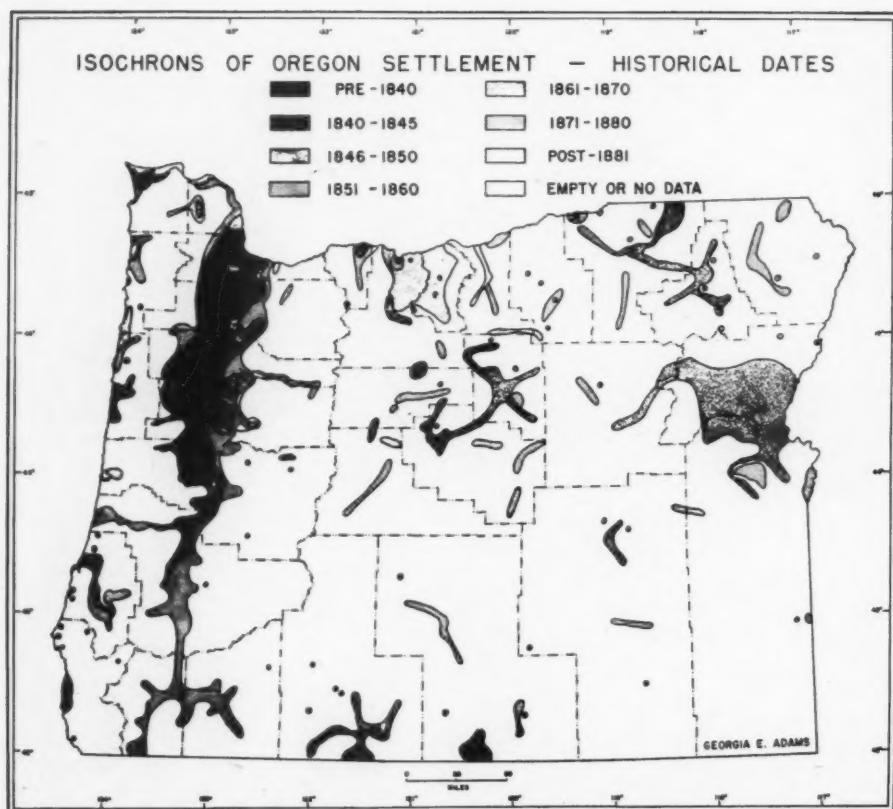


Fig. 1. Historical Dates of Oregon Settlement

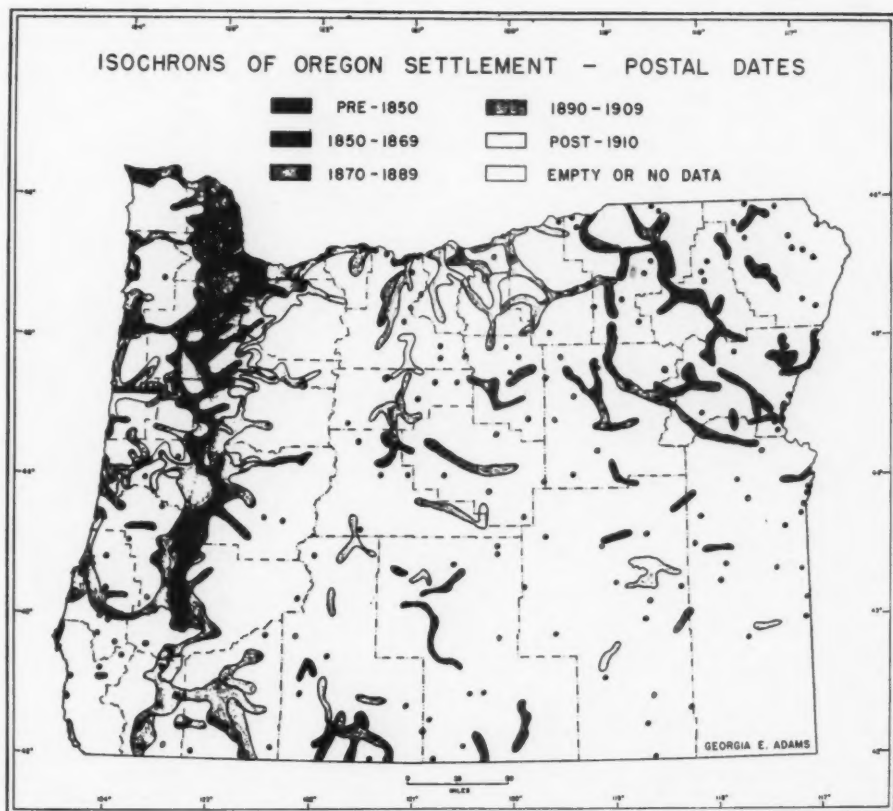


Fig. 2. Establishment of Oregon Post Offices

The Siskiyou and Blue mountain regions owe much to the gold rush days for their initial settlement. Towns sprang up overnight, to supply the needs of the miners, and many of these people remained to continue their agricultural and business pursuits.

The unpopulated aspect of eastern Oregon is a fact and not just a cartographical illusion. It was impossible to join areas on the maps or to make any generalized dating for the area. Much of southeastern Oregon has nothing more than jackrabbits and sagebrush, and has not in fact been completely mapped topographically. Rainfall in the region averages less than 6 inches a year over much of the area, and in some cases a single dwelling in this area may be 25 to 50 miles from the next one. An interesting sidelight in this region is suggested when one realizes that several of the early settlers were cattle thieves, outlaws or renegades, who used the area as a hideout or else changed their names and became respectable citizens. It was not unusual to find cowboys toting pistols, or for members of the community to take justice into their own hands.

A careful study of the maps suggests the following theses concerning settlement in Oregon:

1. Early settlers by-passed the grasslands in the eastern part of the state for the famous and fabulous Willamette Valley for a period of some 20 to 30 years.
2. The greater part of Oregon settlement has moved along the rivers and valleys to the west of the Cascade mountains. The isochrons show the flow of movement from the Willamette Valley toward the less fertile hills along its tributaries, and from this valley into the southern valleys, the coastal region and lastly over the mountains into the eastern portion of the state.
3. There has never been a significant movement toward the middle and southeastern part of the state. In eastern Oregon, settlement leapfroged to where-ever water was available, and the land would support limited agriculture, sheep or cattle raising. In this area, the trend was to settle in the valleys at the foot of block mountains.
4. The Blue Mountain region and the richness of its soils was not discovered on the whole until after the discovery of gold in this region.
5. Early settlement tended to follow the lines of water transportation or the pioneer wagon trails, especially in the Willamette Valley, the Columbia River Basin and the Blue Mountain region.
6. The coming of the railroad in 1870, the gold rush of 1848-50 and the Donation Land Claim Law of 1850 all gave impetus to the growth and development of the region. The Indian uprisings, as a retarding effect in the 60's and 70's, are reflected by the isochrons for that period.
7. Natural barriers of mountains and desert regions have held back the frontier, as have government lands such as the extensive National Forest preserves and Indian reservations.
8. There are still many unsettled areas in this state that may in future years become thriving communities, especially if some means of irrigation can be

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provided, or if growth in the population forces the present frontier boundaries to expand into some of the less fertile regions. The state has many present and potential resources that are either being wasted or are not being used to the best advantage. Whenever adequate markets can be found, and as the state continues to grow, there will undoubtedly by many changes from the present patterns of settlement.

In conclusion, though I realize this paper would have been more adequately covered had time permitted a more thorough search for the scattered information, I feel it is indicative of the trend of settlement for this region. If further studies of this nature are indulged in, I would suggest not using the actual first settlement of a town, but rather the use of a broader base for the study, such as the first settlement in a 10 or 20 square mile area. Such a study should require at least a year or even two spent in locating the data. In this manner, I feel a more valid and thorough analysis could be made both of rural and urban settlement.

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THE 'LOGIC' OF THE SEVENTEENTH PARALLEL AS A BOUNDARY IN INDOCHINA

Forrest R. Pitts

University of Oregon

On July 21, 1954, the newly created Communist state of North Vietnam was separated from "free" South Vietnam by a line running close to the 17th parallel north, from the seacoast westward to the crest of the mountains*. Thus the 17th parallel joined the 38th parallel in the minds of the public as a geodetic boundary between the Communist world and the "free," and the mountain chain between Laos and Tonking joined the Oder-Neisse, the Danube and the Rhodope mountains in serving as more "natural" boundaries between the great ideologies of our time.

Based upon an *ad hoc* decision of the Geneva Armistice Conference, it was officially termed the "provisional military demarcation line." The choice of this line was immediately attacked by various news commentators and scholars. After type had been set, but before the printing of *Asia: East by South*, at the time of partition,, Joseph E. Spencer had a twenty-four hour opportunity to add a brief comment to his manuscript and, in doing so hurriedly wrote a statement containing the following:

"... the present lines of demarcation correspond to nothing in either the physical or cultural landscapes."¹

Before we can condemn a new boundary, we should first thoroughly consider its possible advantages, something Spencer obviously had no opportunity to do. We should ask ourselves to what extent it marks topographical and ecological, historical, and cultural transition areas. It is the purpose of this paper to examine for the Indochina coast the various criteria that are used to delimit "geographic" regions. If even one boundary in nature comes close to the *ad hoc* political boundary, then there would be — in *logic* at least — one point in favor of it. If two or three boundaries were found nearby the 'logic' of the unpopular boundary would be thereby strengthened.

Nature of the Boundary

When we examine the actual line of demarcation, we find that contrary to popular belief, nowhere is the 17th parallel of north latitude actually used as a boundary, a fact of which no one was aware at the first news announcement.

The sea boundary starts at the mouth of the Benhai river (Fig. 1) and trends northeast "perpendicular to the general trend of the coast."² The landward section of the demarcation line follows the *thalweg* of the Benhai river in a south-westward direction to a point about eight miles, or fourteen kilometers, south of the 17th parallel.³ From that point, which marks the southernmost part of the

* Both states compete in using the name Vietnam, the term *Vietminh* properly referring only to the political movement in North Vietnam.

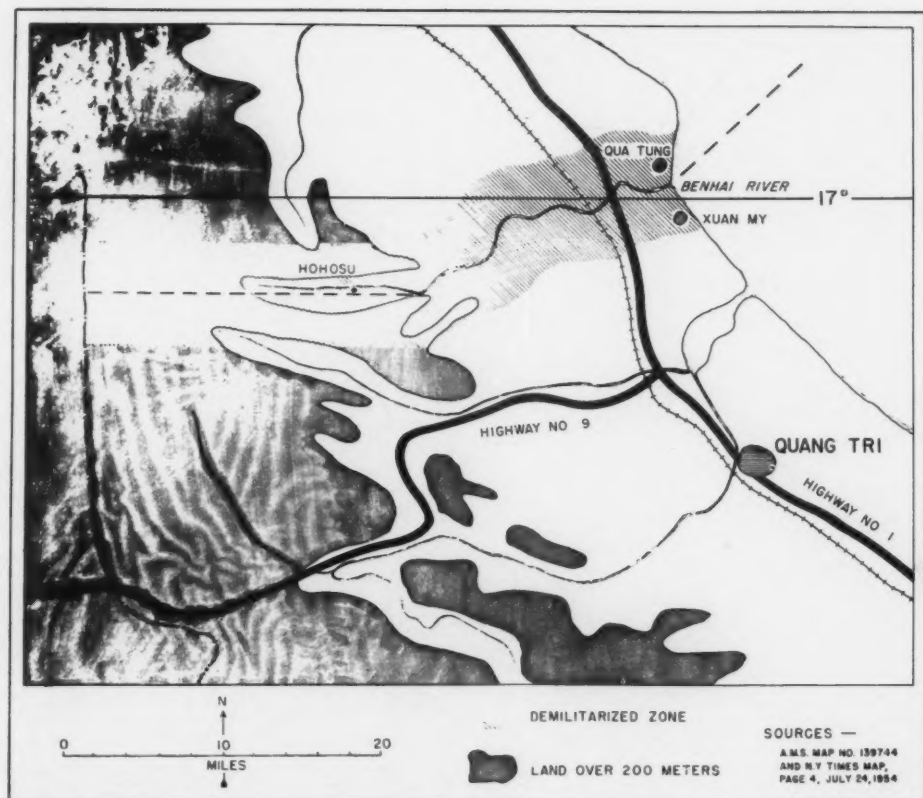


Fig. 1. Demarcation of the Indochina Boundary near the 17th Parallel.

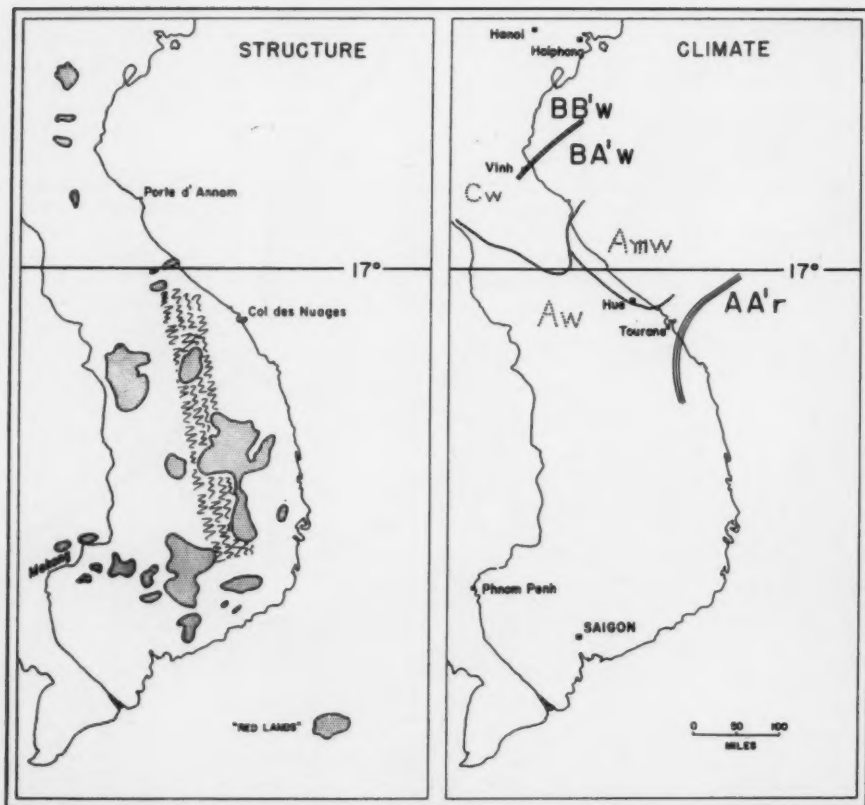


Fig. 2. Structural and Climatic Criteria for the Indochina Boundary.

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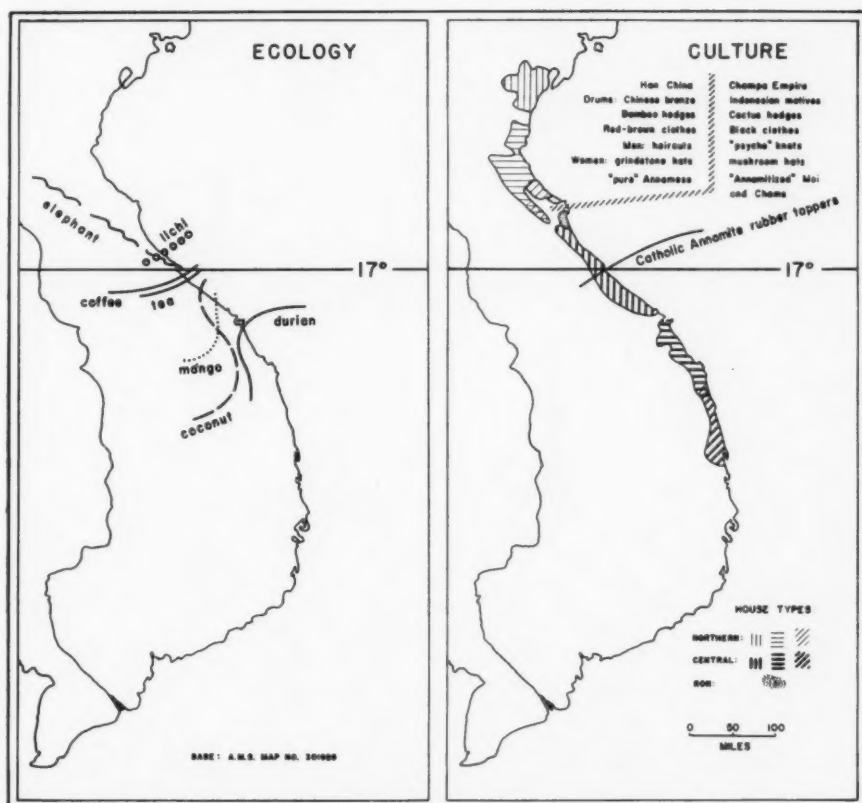


Fig. 3. Ecologic and Cultural Criteria for the Indochina Boundary.



Fig. 4. The Porte d'Annam, from Gourou (Citation 8, page 16).



Fig. 5. The northern grindstone hat, from Franck (Citation 11, page 256).



Fig. 6. The southern mushroom hat, from Franck (Citation 11, page 104).

river's course, a geodetic line proceeds directly westward to the Annam-Laos line, passing just south of the small village of Hohosu. The geodetic line closely follows the ridge of hills south of the Benhai river.

Parallel to the demarcation line and extending from the Laos boundary to the sea, is a demilitarized zone ten kilometers, or about six miles, wide.⁴ This zone includes the "communist-side" village of Quatung — with its famous swimming beach —⁵ and the "free-zone" village of Xuan My. Though there is a declaration in the armistice draft that permits both sides to use the Benhai river for navigation,⁶ there is also included a proviso whereby "... no one may cross the demarcation line without permission from the Joint Commission"⁷ in charge of the armistice.

Topographic Boundaries

In considering the various boundary criteria, we must consider both the locality and the wider area, or province.

The locally most prominent feature is the basaltic massif of Qua Tung (Cua Tung).⁸ This mountain mass which reaches the sea in cliffs — and forces all land traffic to the west — essentially marks the northern end of the mountain mass (Fig. 2, structure map) that Dobby records as starting just north of Saigon.⁹ To the West may be seen the jagged mass of resistant rock known as the Tiger's Tooth, over 4,100 feet high, which "rips the blue sky like a great canine."¹⁰ Of this coastal area, the traveller Harry Franck wrote:

"... The scantiness of the country, the paucity of its arable land, seemed to be emphasized here; for Annam gets very narrow indeed north of Hue, so narrow that it all but breaks in two."¹¹

In a wider sense, the mountains from the Qua Tung massif north of the Porte d'Annam mark the transition from the folded sedimentaries of Tonking — with this famous karst forms — to the resistant crystalline rocks of Annam Laos.¹² The intense folding near the end of the Triassic affected Tonking, North Annam and Upper Laos — all north of the 17th parallel — but left undisturbed or relatively so were the sediments of the lower Mekong Basin.¹³ Though folding in the south was slight, fracturing of some of the ancient folds took place, and basaltic lava poured out. The fertile "red lands" (Fig. 2, structure map) of upland Indochina — which occur most south of the 17th parallel — are of this decomposed basalt.¹⁴

Finally, we must note that the deltas of Tonking and the deltas of Cochin China are basically different in form. In Tonking the rapid erosion of weak sedimentaries by rains both summer and winter has produced a delta that is steeper than that of Cochin China, and one much less troubled by salt water.¹⁵ The long dry season in the Mekong drainage basin not only permits sea water to rise in the water table, but also prevents year-round silt deposition in the main deltas of the south.

Climatic Boundaries

The 17th parallel passes through an area which has a less dense concentration per unit of arable land of people than do the areas farther to the south and to the north. The reasons for the less dense population are two-fold: less rain in the winter than is true in Tonking to the north, and less summer rain than is received by the Mekong delta to the south. In winter the Hue area lies in the rain-shadow of Hainan Island, so that the northeast monsoon brings less rain here than it does either to Tonking or to the plains south of Tourane. Over most of Laos and Cochin China.

" . . . The summer monsoon winds are usually moisture-bearing, but those which cross the Annam mountains and descend to the coast, known as the "Winds of Laos" are dry and hot, having lost their moisture en route."¹⁶

The peak period of rain comes in the autumn months in the Hue area. The good it does the rice crop is usually overbalanced by the damage the typhoons wreak upon the fields. It is thus easy to see why the Hue area is less densely populated than other coastal areas.

Dobby, using Koppen's climatic system, labels the Hue area **Amw**.¹⁷ To the north is the **Cw** area, embracing essentially those areas in Indochina surrendered to the Viet Minh by the Geneva armistice. To the south and west is the **Aw** area, embracing most of Thailand, Laos, and Cochin China, as well as large parts of Cambodia (Fig. 2, Climatic map).

Other criteria of climatic classification also recognize the transitional nature of the Hue area. The 17th parallel just bisects the **BA'w** Thornthwaite climatic area (humid tropical; rainfall scanty in winter, abundant in summer).¹⁸ The somewhat cooler humid mesothermal area lies to the north, and the continuously humid tropical area is found along the coast south of the Col des Nuages.

Ecological Boundaries

The climatic boundaries just outlined are reflected in the plant and animal distributions (Fig. 3, Ecology map). On the Annam coast, the northern limit of both the mango and the (fruiting) coconut are in the Hue plain.¹⁹ Other crops also have their northern limits here, for Robequain writes:

"Most of the new plantations are in the southern part of the peninsula for reasons, first, of climate and, second, of soil. North of Hue, the relatively cold winters prevent all rubber cultivation and likewise hinder the growth of tea and coffee plants in the highlands, which would otherwise be suitable for European colonization."²⁰

Older coffee plantations — for historical reasons — are found in Lower Tonking "on the old alluvial terraces, remnants of a worn-out delta . . . at low elevations — generally less than 100 meters . . ." ²¹ Of this region — north of the 17th parallel — Robequain states:

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"Climate has been another obstacle to the development of the coffee plantations. The blossoms were sometimes washed off by heavy rains; the maturing of the berries, which ripen over a period of several months and must be picked one at a time, can be thwarted by summer drought; in regions near the sea there is always the dreaded possibility of typhoons, and everywhere there is the damp cold of winter. Here the coffee plant is at the northern limit of its habitat."²²

Other crop limits in the pinched coastal area are those of durian,²³ which is a component of the "South Sea Island scenery (south of the) *Col des Nuages*,"²⁴ and the *lichi*, which is "more frequently grown in the northern lowlands than in the south."²⁵ Commercial production of sugar cane is more common in the south, where the Western style sugar refineries are located.²⁶

Finally, we note that the modern northern limit of the Indian elephant in its natural state is located in the Hue area.²⁷ The elephant is used in the ceremonies of the Imperial Court at Hue, but it is "captured and domesticated," not by the Annamese, but "by the Laotians and Muong."²⁸

Historical Boundaries

It is hard to escape the conclusion that, in a historical sense, a division at the *Porte d'Annam* would have been more "logical." In fact, it was reported by Drew Middleton²⁹ that Eisenhower and Churchill had approved seven principles for a settlement, one of which was division of Vietnam near the 18th parallel. The "Gate of Annam" (Fig. 4) is there, and represents a good number of historical boundaries (Fig. 3, Culture map). Franck observes:

"To all intents and purposes we had come to the end of Annam. What the Chinese named the Eminent South Country was usually reckoned as beginning on the north at the Gate of Annam, as this pass has been called for centuries. This was the old Annam-Tonkin boundary; there is still the vestige of an ancient wall built along the summit by the Annamese to protect themselves from invasion, and many great battles have been waged there. Today the official boundary is much farther north . . ."³⁰

In describing the hewn stones, axes, iron arms, ceramics, and earring-like disks of the Song-Ma site in Thanh-Hoa province — whose southern border is at the Gate of Annam — Goloubew comments:

"All these discoveries suggest a composite civilization, half Chinese and characteristically half native, in which the bronze art had reached a very high stage of perfection and intensity. A characteristic feature of that half barbarous civilization seems to have been the common use of metallic drums. (These) . . . belong to a settled period of Indochinese history, corresponding to the conquest of Tongking under the later Han, and to a center of diffusion distinctly situated in the North of Annam, near the sea.

"The archeological discoveries in the Thanh-Hoa province thus seem to corroborate the accounts of Chinese texts according to which the first

bronze drums should have been made during the pacifying campaign carried on by general MA YUAN against the Annamites in the first century of our era.

"However, there remains to explain the meaning of the figures engraved upon several of these drums and to determine the ethnic "milieu" to which they belong and which, as seems, has no relation with the mountain tribes spoken of by Chinese authors. In fact, these figures are closely related to some Indonesian representations . . ." ³¹

The traveller Franck, in describing his trip from Hue to Hanoi, wrote:

"A slightly different human type appeared beyond the Gate of Annam, stockier, the women perhaps a bit better looking, or more nearly good looking. . . . In fact purists among the French anthropologists of Indo-China insist that the real Annamese are not in the handle of the dumb-bell at all, but in Tonkin, because south of the Gate so many tribes have been Annamited, so to speak, mingled in blood and culture with the conquerors from the north." ³²

It is undoubtedly true that Vietnam south of the Gate of Annam is different from Tonking. Brodrick writes:

"At Phong-Nhu are great underground galleries, halls, temples, and passages in the limestone, and the main temple alone has fourteen halls. The workings are late ninth and tenth century. At Lac-son there are caves full of Cham alphabetic inscriptions. India came as far as this. Then you pass near the Gate of Annam." ³³

He also refers to the province of Thanh-Hoa as "the southernmost limit of the first Chinese conquests." ³⁴

From the time it was conquered in the second century B.C., ³⁵ Annam — "The Pacified South" as the Chinese called it — was under the influence of Chinese thought and way of life. The native animism of the Annamese people was overlain by Mahayana Buddhism. A slow expansion southward along the coast began, and by the third century of our era, the Annamese had reached as far as modern Tourane. ³⁶ However, they were not in possession of the territory for long, as the Cham people pushed northward. "The site of Hue was occupied by them in A.D. 248." ³⁷ Their kingdom still extended north of Hue in the tenth century. ³⁸

It was at this time that the Annamese threw off Chinese political control, and became independent. They resumed the gradual expansion down the coast that had been started eight centuries previously. By the end of the 14th century the Champa kingdom was finally defeated. The coastal region is now by no means pure Annamese. Konrad Bekker has pointed out that "the local people were pushed back, but over a period of time they became assimilated." ³⁹ Robequain has also stated that "thorough study will prove that many of the inhabitants of central Annam are also "Annamitized" Moi or Chams. . . ." ⁴⁰ He points out, in addition, that the term Annam was for most of history limited to Tonking and the area north of the Gate of Annam: "In earlier times the name

Cochin China referred only to the deltas of central and southern Annam."⁴¹

In the latter part of the 18th century—the 1785 Tay-son rebellion and aftermath — the Le dynasty was overthrown, and eventually the emperor Gia-Long of Hue, born Nguyen-Anh, ascended the throne. Brodrick comments on this:

The way was open for the unification of all the Annamese lands under the Emperor Gia-Long, but the Tongkingese have never really taken the Nguyen sovereigns to their hearts and the Nguyen emperors have never resided in Tongking but always at Hue, farther south in Annam proper.

"Still to this day the more old-fashioned Tongkingese will tell you that the real king is hid somewhere in the mountains to come forth when it is time, an Annamese Barbarossa."⁴²

Cultural Boundaries

Most of the noticeable but not too meaningful transitions in modes of peasant life cluster about the Gate of Annam, at the 18th parallel, rather than at the armistice demarcation line.

Gourou, in his study of Annamese house types, found that the two main roof types, that of North Annam and that of Central Annam, divided roughly at the Porte d'Annam (Fig. 3, Culture map) with the aberrant Ron roof type being dominant in that immediate area.⁴³

The language of Vietnam has several dialects, and that of Tonking differs from that of Annam only slightly: "... the differences are mainly ones of pronunciation and phrasing, but Cochin-Chinese has a number of words peculiar to it."⁴⁴

Differences in wearing apparel are noted north and south of the Gate of Annam. Black clothes to the south, cinnamon-brown to the north; and grind-stone shaped hats for northern women (Fig. 5), mushroom hats for women of the south (Fig. 6) were noticed by Franck.⁴⁵ He also noted that the men of the north had haircuts, while those of the south were more liable to have their hair done up in a "Psyche knot."⁴⁶

Like Gourou, Franck also recorded slight differences in settlement:

"The graves were now well weeded knobs on top of large raised circles of earth; the towns, almost as compact as China, were surrounded by high walls of growing bamboos. The more straggling towns south of the Gate of Annam had been encircled, if at all, by hedges of cactus or wild pineapple, concealing nothing. . . ."⁴⁷

In only one respect does the armistice line mark a definite boundary in the human landscape. It is the northern limit of the Catholic Annamite settlement of Quang Tri, which has provided many of the rubber tappers for the plantations of the "red lands" of South Annam and Cochin China.⁴⁸

In the more recondite realm of regional character, differences have been

noticed. Contrast Dorgeles' statement, "The Tongkingese simply never rests."⁴⁹ with his description of the Annamite: "The Annamite makes no effort to resist but simply lets himself drift. It might be said that he lives at slow tempo; his everlasting relaxation rests him like sleep."⁵⁰

The French anthropologist Janse also contrasts the actions of those in the north with those of the south, but attributes the difference to climate:

"In their native Tonkin they are a hard-working people, but they appear to lose their capacity for heavy labour in the more enervating climate of the south."⁵¹

There remains to be considered under the category of cultural regionality the vast differences between the deltas of Tonking and those of Cochin China. Again, it is Robequain who provides the most succinct analysis:

"What are the obstacles to Tonkinese immigration into the southern plains? In the first place, although it is delta land, western Cochin China is very different from Lower Tonkin. It is true that the immigrant settles on rice lands here, but they are rice lands which cannot be cultivated like those at home; the absence of dikes, the constant struggle against salt water and even the size of estates, all are new problems. In addition the northern Annamite does not stand on an equal footing with his new neighbors; he must learn a dialect quite removed from his own and accustom himself to strange habits of mind, less tradition bound than his.

"Furthermore the Cochin Chinese do not look with approval on mass migrations from Tonkin. They are aware, of course, that there still is unoccupied land in the country, but they feel that it will be taken up within a half century if Cochin China's population continues increasing at the present rate."⁵²

Summary of the "Logic" of the 17th Parallel

Most of the historical and cultural boundaries cluster near the **Porte d'Annam**, at the 18th parallel. Most of the physical boundaries — that is, crop and animal limits, pass near the **Col Des Nuages** near Tourane at the 16th parallel.

One is lead to believe that the great weight of Chinese culture from the north will cause Tonkingese customs to push southward to the Benhai river, and that progressive warming of climates will push the ecological limits north to that line. Then everyone will be happy.

Seriously speaking, the 17th parallel area is linguistically as good a boundary as that between Spain and Portugal. Climatically it separates areas far more distinct than does the line between Texas and Mexico. It passes through an area that is, historically considered transitional. It cleaves no major population concentration. Nor does it cut through the mid-belt of any major crop or economically valuable tree. Rather it is true that it was drawn — unintentionally to be sure — fairly close to a number of major crop and tree boundaries.

718

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Surely it is unique to find a political boundary almost co-terminous with so many physical and cultural boundaries. Yet both sides to the dispute that gave birth to the boundary regard it as temporary. It is this writer's opinion that the 17th parallel in Indochina as worked out in detailed demarcation, may prove at least as permanent as the *ad hoc* boundaries drawn at the close of the last war. Its position within so many major zones of transition may strengthen its weak political justification.

There remains only the question of the future of the armistice line as a possible permanent political boundary.

Future of the 17th Parallel As A Boundary

In considering this aspect of the problem, it is well to keep in mind what Eric Fischer has to say on boundaries:

"Each boundary whether naturally marked or not, tends to create by its very existence certain conditions which are ponderable factors in further boundary-making. The longer a boundary functions especially an international boundary, the harder it becomes to alter it. The transportation net gets adjusted to the boundary, market towns take their specific importance from it, habits of the local population are shaped by it, ideas are moulded under the impact of different educational systems."⁵³

His comment on the Brenner border in South Tyrol may be applied *mutatis mutandi* to the 17th parallel:

"What started as a boundary imposed by force and based on a geographical foundation of doubtful validity is acquiring geographical soundness by the actions associated with its continued existence."⁵⁴

Several factors are in favor of the continued existence of "free" South Vietnam. One of these is that it has kept the metalled surface, all-weather road, Highway No. 9 (Fig. 1) connecting Quang Tri with Savannakhet in Laos. The transportation net is thus circular in general outline, and will help to unite the southern state. Another is the separatist sentiment in Cochinchina,⁵⁵ which received short political recognition in 1948. A third is that Premier Diem has gained the support of dissident, anti-French elements, who formerly looked with mild favor on Ho Chi Minh. Senator Mansfield has summed up the hope of the free world in backing Diem:

"The free south is potentially in a better position to unify Viet Nam than the Communist north. Its advantage lies not only in a superiority of resources but in its orientation toward freedom rather than totalitarianism. While the north is likely to come increasingly under the domination of Communist China, the south can grow steadily more independent. In short, Diem's star is likely to remain in the ascendancy and the of Ho Chi Minh to fade — because Diem is following a course which more closely meets the needs and aspirations of the Vietnamese people."⁵⁶

It may be that unification will not come about, and that the demarcation

line along the Benhai river will become increasingly effective in marking the boundary between north and south between Communism and freedom.

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LIVESTOCK ORGANIZATION IN THE FORMERLY NOMADIC LIVESTOCK AREAS OF THE SOVIET UNION

Howard K. Albano

University of Washington

The following discussion is an attempt to clarify the present organizational structure of the formerly nomadic livestock industry of the dry areas of the Soviet Union. Within this area are included the Union Republics of Central Asia and Kazakhstan, Astrakhan and Rostov Oblasts in the R.S.F.S.R., and parts of the North and Trans-Caucasus. This attempt at clarification appears necessary because the collective system of agriculture has been discussed by most western writers as though it had been imposed in an unvarying form over the whole of Russia.¹⁻² In the case of the former nomadic livestock industry of the areas indicated, at least, this does not appear to be the case. Since the fundamental characteristics of the collective system of agricultural organization in the Soviet Union are perhaps not generally familiar, a short discussion of these characteristics will be included. The bulk of the paper will then be devoted to a consideration of the organization of livestock in the formerly nomadic areas.

The Collective System of Agriculture

In terms of sown area the most important institution in the collective system is the kolkhoz. These are large scale units of from 1,000 to 2,000 or more acres cultivated on a collective basis. The state, which owns all land in the U.S.S.R., grants each kolkhoz a certain acreage in perpetuity. The increment of production after the obligatory fixed demand of the state has been fulfilled, and after the demands for storage, seed, and machinery rent have been satisfied, is divided amongst the members of the kolkhoz. Approximately 85-90% of the sown area of the U.S.S.R. is cultivated by the kolkhozes.

A second institution, the sovkhoz or state farm, is an even larger scale unit than the kolkhoz. It is owned and operated by the state with the aid of hired labor which receives a fixed wage. All products produced go to the state.

A third Soviet agricultural institution that is an integral part of the collective system even though it does not directly cultivate any agricultural land is the Machine Tractor Station. The Machine Tractor Stations supply the power machinery and other heavy equipment needed in the operation of the kolkhozes. The sovkhozes own and manage their own machinery.

The Organization of Livestock Production In The Formerly Nomadic Areas

It is contended that the organization of livestock production in the areas indicated differs in certain aspects from that in the remainder of the Soviet Union. It is further contended that the system of livestock organization that has evolved under the Soviet regime is not fundamentally different than that under

the old nomadic order.

In pre-collective times nomadic livestock production prevailed in dry areas of the Soviet Union. Nomadism is defined as being the lateral movement of animals on pasture the year around with little or no winter feeding of stored hay and no fixed base of operations. This system pre-dominated in the relatively flat areas of Kazakhstan. In the Caucasus and in the Central Asian Mountain Ranges a form of nomadism, transhumance, was practiced. Transhumance refers to the movement of animals across vertical vegetative zones — from a low to a high elevation in the spring and to a lower elevation again in the fall. In this paper the term nomadism refers to both the lateral movement of livestock common in Kazakhstan and to the vertical movement of livestock common in Central Asia and the Caucasus.

The collective system of agriculture instituted by the Soviets in 1929 and essentially completed by 1933 or 1934 produced the kolkhoz-sovkhoz structure characterized previously. This same formal structure was imposed in the nomadic areas, however, there appears to have been a significant time lag in the effective imposition of even the formal structure, and in addition, the resultant actual form has not been the same as in the remainder of the Soviet Union.

Resistance to collectivization was particularly strong in the nomadic areas. Loss of both livestock and human population during the collectivization period was more pronounced than in any other area of the U.S.S.R. Volin gives a figure of 7,378,600 head of cattle for Kazakhstan in 1928 and 3,095,400 in 1938.³ In the Central Asian Republics cattle numbers fell from 3,893,400 in 1928 to 2,630,300 in 1938. The rural human population, either through death or because large numbers were conscripted to work in the new industrial plants being constructed during the First Five Year Plan, in some cases actually decreased. Throughout the rest of Russia during this period, reorganization of agriculture into the collective system proceeded, and by 1940 approximately 97% of the peasant families were on kolkhozes or sovkhozes. After the initial attempt to collectivize agriculture in the nomadic areas, there appear to have been no further serious attempts made at an effective reorganization until 1942. At this time a directive was issued concerning, "measures for maintaining young animals and increasing the number of livestock in the kolkhozes and sovkhozes".⁴ Embodied within this directive was the introduction of the so-called "otgonnyi system" of livestock production. The "otgonnyi system" supposedly differs in the following ways from the pre-collectivization nomadic system:

1. Crop cultivation is practiced to a greater extent than under the nomadic system.
2. Veterinary facilities are available.
3. Hay is stored in the necessary quantities for winter use on the kolkhozes and sovkhozes in the "otgonnyi" livestock areas.
4. Cattle shelters have been constructed under the "otgonnyi system."

These asserted changes appear to be merely improvements upon the old nomadic system. Under the "otgonnyi system" livestock production is still carried out on a shifting basis. Although all livestock, with the exception of those

individually owned, are owned by a sovkhos or kolkhoz, crop cultivation is not, in most cases, connected with livestock production. Cattle are pastured the year around on natural pasture and receive supplementary feed during the winter only in cases of emergency. Cattle movements are still essentially the same. Two long moves per year are made: (1) from winter to summer pasture and (2) from summer pasture back to the areas of winter pasture. Within the summer and winter pasture boundaries movement continues in a shorter orbit. Veterinary service and the building of cattle shelters do not signify any profound change. They are again merely improvements introduced to make the old nomadic system more efficient.

In the nomadic areas of the Soviet Union cattle are not pastured within the confines of the kolkhoz or sovkhos boundaries as they are in other areas of the U.S.S.R. In these areas there are large acreages of state land that are not included in the collective holdings. This land, called the "state land fund", is the basic pastureland for cattle produced under the "otgonnyi system". It is allotted to the collectives free of charge. Of the 750,000,000 hectares of state land in the Soviet Union, 250,000,000 hectares are situated in the areas of "otgonnyi" livestock production, that is Central Asia, Kazakhstan, the Caucasus, and the land around the northwest shore of the Caspian Sea in the R.S.R.S.R. Most of the remaining 500,000,000 hectares is in the European and Siberian North. By using this land as pasture it is possible for a collective to own and raise cattle, if no winter feeding is done, without the livestock ever having been within the borders of the collective or state farm which owns them. The kolkhoz or sovkhos, in this case, merely serves the role of financing and managing the herds. In the remainder of the Soviet Union livestock are reared within the confines of the kolkhoz or sovkhos and are an integral part of the farm economy.

In 1949-50 Machine-Livestock stations were introduced in the areas of "otgonnyi" livestock production. Apparently these stations perform the function of preparing a limited supply of feed for winter use, shearing sheep, the digging of additional wells for livestock and other miscellaneous duties. Presumably, since their role is somewhat analogous to that of the Machine Tractor Station, they are compensated for their services by the kolkhozes and sovkhos whose herds they serve. The Machine-Livestock station is another distinctive feature of livestock production in the formerly nomadic areas. It is found in no other area of the Soviet Union.

Since the inception of the "otgonnyi" system" in 1942 and at least until 1949-50, continued emphasis was placed on this system. In the state plan of development for 1945 it was emphasized that the continued development of the "otgonnyi system" was desirable.⁵ Additional measures were projected to provide for the assimilation of new early season pasture land. By 1951 the future development of the "Otgonyi system" was discussed more cautiously in the Soviet periodicals than previously. In these discussions attention was centered around the development of a closer working connection with irrigated as well as non-irrigated agriculture being carried on by the kolkhozes and sovkhos within or on the borders of the area of "otgonnyi" livestock production. The fact that the Great Stalin Plan for the Transformation of Nature, which appeared at about this time included extensive plans for the development of irrigation agriculture in the northern Caspian area and in Central Asia was undoubtedly a

factor contributing to these cautious statements about the "otgonnyi system". The "stall-feeding system", or the winter feeding of cattle on hay rather than pasture, was advanced as being better suited in some areas to the further development of the livestock industry,⁶ particularly in Astrakhan and Rostov Oblasts.

In addition to these developments, plans also included provisions for "obvodnenie" and "limmanoe" irrigation. "Obvodnanie" irrigation is the development of stockwatering facilities. "Limmanoe" irrigation is the flood irrigation of natural vegetation once or perhaps twice during the spring. Later during the summer this vegetation is mowed and stored for the winter use of cattle.

The present status of these projects is in doubt. There are many indications that the original plans which involved the irrigation of very large acreages are not being implemented. However, some development is taking place and although the effect on the future development of the "otgonnyi system" will not be as great because of the curtailment of the original irrigation plans, it appears, at least in the Northwest Caspian Area, that the "otgonnyi system" has been strongly modified, i.e. the winter feeding of stored hay is becoming more common.

In areas of "otgonnyi" livestock production further removed from irrigated or other cultivated acreage, for example in Central Kazakhstan and along the eastern side of the Caspian Sea, the "otgonnyi system" will probably be maintained in approximately its present form. That is, livestock will be grazed the year around on natural pasture in essentially the same way that they were before collectivization. In the Caucasus and in the Central Asian Republics where livestock production under a transhumance system predominates, the existence of irrigated areas in the lowlands will probably lead eventually to a closer connection between livestock production and crop agriculture. At present, however, most of the livestock produced in the areas of transhumance, the Caucasus and Central Asia, are wintered in the lowlands on natural pasture. Winter feeding is done only in the case of a particularly severe winter.

The effectiveness of the "otgonnyi system" in reviving the cattle industry in the dry areas of the Soviet Union has been substantial. In Kazakhstan, where a large proportion of the livestock are maintained under the "otgonnyi system", livestock numbers increased from twenty seven million head in 1938 to fifty seven million in 1951.⁷ For Central Asia, Kazakhstan and the Caucasus livestock numbers under the "otgonnyi system" increased 4.5 times from 1942-43 to 1949-50.⁸

The main reason for the success of the "otgonnyi system" appears to have been the systematizing of the old nomadic system, i.e. the more complete usage of pasture, the development of livestock watering facilities, the introduction of veterinarians, and some supplementary winter feeding. It is suggested that this systematization process was undertaken only when it became apparent to the Soviets that, in order for the livestock industry of these dry areas to flourish, it was necessary to depart from their policy in force from 1929 to 1942 of settling the nomads. In 1942 this departure was made with the introduction of the "otgonnyi system", in effect a reinstitution of the old nomadic order along with

the improvements mentioned.

There are two main forces that have acted to change the agricultural order in the nomadic areas of the Soviet Union. The first, the introduction of the collective system and the relatively minor changes that have resulted compared to change in other areas of Russian agriculture, has been discussed. Collectivization has been in effect for more than twenty years and appears to be essentially complete. Its effect on these areas has been fully felt. It is not likely, unless a large scale reorganization of the collective system is made, that any further changes in the organization of livestock production in the nomadic areas will come from this direction. A second force, that is at present only a source of potential change, is the extension of the cultivated area, and particularly the cultivated area under irrigation. A large share of the expanded crop acreage, both irrigated and non-irrigated, under the Soviets has been either within or on the periphery of the nomadic areas. Except for the "virgin and idle lands project"⁹ initiated in 1954 the inclusion of cultivated land into former pasture lands has not been significant in terms of area, however, in many cases the more desirable, well-watered pasture lands have been put under cultivation and lost for pasture purposes. The simple extension of the cultivated land in these dry areas on which wheat or other small grains are the main crop, other than the factor of decreasing the available pasture, probably will not fundamentally effect the organization of livestock production.

It would seem that the major potential source of change lies in the extension of the irrigated area. This extension could conceivably lead to an interconnection of crop cultivation and livestock production that would be similar to the situation in the western United States where cattle are fed during the summer on natural range feed and during the winter on hay and grain grown on irrigated farms. The development of this interconnection would mutually benefit both the irrigated and livestock sectors — the livestock sector from winter feeding and the irrigated farms (kolkhozes and sovkhozes in the Russian case) for being provided with the economic justification for including fodder crops in their crop rotation system.

This presumed future interconnection hinges largely on the implementation of already irrigation projects for the Northwest Caspian area and Central Asia. No extensive irrigation developments are under way at present, so in this sense the interconnection is only problematical. Until these irrigation plans are again actively promulgated the future of the "otgonnyi system" in its present form appears likely.

Summary

The social, economic and technical changes that have taken place in Russian agriculture have not been nearly as thorough in the areas of the country where livestock production under a nomadic system predominated prior to collectivization. The few changes that have been made appear to be merely improvements upon the former nomadic system of livestock production. Livestock are grazed the year around on natural pasture as they were before collectivization. The movement of the herds both in direction and length of orbit are approximately the same as in pre-collective times.

The fact that there has been so little change in this area of Russian agriculture under the Soviet regime has gone largely unrecognized in western literature though it had wrought equally deep changes in all areas of Soviet agriculture. At least in the case of the livestock industry of the dry areas of the Soviet Union where a nomadic system predominated prior to collectivization, change compared to other areas of Soviet agriculture has been minor.

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5. **Ibid.**
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7. The following weighted values have been used: sheep and goats — 1, cattle — 6, horses — 6.
8. Badir'ian, **op. cit.**, p. 516.
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THE DEVELOPMENT AND SIGNIFICANCE OF TEA CULTIVATION IN THE SOVIET UNION

Robert M. Bone

University of Washington

The Government of the Soviet Union has been actively developing a domestic tea industry, as part of its self-sufficiency policy, with the ultimate goal of satisfying the national demand.¹ The Soviet's autarkic tea program is a complete reversal of the Tsarist policy of importing teas, notably from China, India, and Ceylon, to the extent of about 98 % of the total demand. In contrast, only about 17 % was imported in 1950.² The rationale behind the Soviet's desire to end imports is based on state policy. However, as tea was and is the popular national beverage, the Russians attempted to replace imports with local production. Thus tea culture along with growing of other subtropical plants such as citrus fruits, expanded in area, creating resource allocation problems in the limited area of subtropical Georgia.

At first, as far as tea production was concerned, the allocation problem did not become acute as sizable imports continued and rapid expansion of cultivation was achieved in western Georgia. During the post World War II period, little land remained in the Soviet subtropics for immediate expansion. Some tea land irrigation and drainage was carried out in limited areas in Azerbaidjhan and Georgian S.S.R.'s respectively. However, the alarming scarcity of subtropical land has caused the Soviets to turn to other areas in the Union for tea lands although Tsarist agronomists considered that it would be foolish to attempt to expand commercial tea cultivation in any other region of Russia than western Georgia.³

The purpose of this paper, then, will be to evaluate the present Soviet policy of increasing tea acreage with respect to the ultimate autarkic goal of the Soviet Government and to the natural conditions of the regions.

The Natural Requirements

The tea plant, bush, or tree, botanically called *Camellia sinensis*, is an ever-green of the camellia family. Although the plant flourishes and yields best in a tropical climate, it will grow in almost any climate so long as there is no severe drought or cold period. A cool, humid climate such as the Pacific north-west or a tropical wet-dry climate with temperatures of high as 115°F and with humidity recordings as low as 17 %, will permit the plant to grow.⁴

However, most of the world's commercial tea plantations are located in tropical climates with high temperatures of around 80°F., a small diurnal range, and a reliable and abundant rainfall throughout the year of at least 60 inches.⁵ As a result of these favourable conditions, there is a continuous growth of the tea leaves and a remarkably stable leaf quality corresponding closely to the minute climatic variations.

An annual sum of 5432° of daily temperatures in degrees fahrenheit above 50°F. is required for the maturing of tea leaves. Below 50°F. growth ceases, and at 29°F., buds and flowers are killed. The plant itself is retarded and damaged by temperatures of 5°F.⁶

Although the demands of the tea plant upon the soil are not exacting, the quality of the leaf is very strongly influenced by soil conditions. A well drained acidic soil is considered best for tea cultivation as it tends to produce a favourable balance of taste and aroma.⁷

The Historical Development

In Russia, tea has been cultivated commercially since 1893, although tea experimental stations were established some 60 years earlier.⁸ In 1913, acreage had expanded to 1,825 acres, supplying about 2% of the national consumption of 150 million lbs.⁹ In the period from 1917 to 1921, acreage dropped to 405 acres due to the civil war and neglect.¹⁰

Following the rise of the Soviets to power, a governmental agency called Centrochai was established to regulate all aspects of the tea business. In 1925, however, tea cultivation came under the direction of a special corporation, Chai-Gruzia.¹¹ The corporation was designed to aid in enabling the government to control all phases of trade, production, and consumption of tea. The first task of the Soviets was to rehabilitate the tea plantations which were severely damaged during the civil war. By 1923, the acreage of 2,471 acres slightly exceeded the 2,209 acres of 1913, and by the end of 1929, acreage had more than doubled to 5,575 acres.¹²

In the early 1930's, the government sharply stepped up its efforts to satisfy the national demand for tea from local sources primarily by expanding acreage in western Georgia.¹³ By 1933, the affect of the new directive had invoked a thirteenfold increase in acreage to slightly more than 34,000 acres over the 1929 figure of 5,573 acres.¹⁴ Similar expansion continued to occur until 1941, the first war year, when the cultivated area exceeded 130,000 acres, yielding some 284.3 million lbs. of tea leaves.¹⁵

The Present Situation

For the decade that followed 1941, there is no evidence of any progress in production or acreage. In 1952, however, the 19th Party Congress, aiming at attaining by 1960, 210,535 acres of tea land, developed a two-point program:

- (1) to increase acreage of old regions:
 - (a) Georgian S.S.R.
 - (b) Krasnodarsk Krai of the Russian S.F.S.R.
 - (c) Azerbaidjhan S.S.R.
- (2) to investigate the potential of new areas:
 - (a) Ukraine S.S.R.
 - (b) Moldavian S.S.R.
 - (c) The Crimea

- (d) Northern slopes of the Caucasus mountains
- (e) Central Asian Republics
- (f) the Far East.¹⁶

The Old Regions

Although tea culture was originally developed in Georgia, near the town of Batumi, by 1953, the Georgian S.S.R. cultivated 87% (149,496 acres) while Azerbaidjhan S.S.R. and the Krasnodarsk krai had 9% (16,062 acres) and 4% (7,413 acres) respectively.¹⁷

Today, the tea regions of Georgia are broken into seven districts:

1. the coastal zone of Abkhazia
2. the northern foothills
3. the southern foothills
4. the Colchis lowlands
5. the coastal zone of Adzharia
6. the western zone
7. the eastern foothills

The Distribution of Tea Cultivation in the Georgian Republic ¹⁸ (thousands of acres)

| District | % 1925* | | % 1932 | | % 1940 | | % 1953 | |
|----------|---------|-----|--------|------|---------|-------|--------|-------|
| 1. | | | 13.6 | 11.1 | 18.4 | 24.1 | 21.2 | 31.7 |
| 2. | 0.4 | 0.1 | 33.1 | 27.0 | 32.7 | 42.8 | 31.7 | 47.4 |
| 3. | 16.4 | 0.5 | 33.4 | 27.3 | 25.0 | 32.7 | 21.1 | 31.5 |
| 4. | | | 2.0 | 1.6 | 2.8 | 3.7 | 5.0 | 7.5 |
| 5. | 83.2 | 2.3 | 13.4 | 10.9 | 10.6 | 13.9 | 9.4 | 14.1 |
| 6. | | | 2.4 | 2.0 | 7.9 | 10.2 | 7.9 | 11.8 |
| 7. | | | 2.1 | 1.7 | 2.8 | 3.7 | 3.7 | 5.5 |
| Total | 100.0 | 2.9 | 100.0 | 81.7 | 100.0** | 130.9 | 100.0 | 149.5 |

*As the 1925 data was not available, an estimate of 2,900 acres was made based on 1926 figure of 3,339 acres and 1923 figure of 2,470 acres. **An error of 0.2% (100.2%) was in the Russian publication.

From Adzharia A.S.S.R., the site of the original commercial development of tea plantations in Georgia, cultivation has been pushed northward, even extending into the Krasnodarsk krai of the Russian S.F.S.R. as far as the Kuban River.¹⁹

It has been estimated that Georgia can expand its area by some 61,750 acres.²⁰ But poorer varieties of podzolic soils and hazardous climatic conditions have not warranted such expansion before the cultivation of irrigated tea land in Azerbaidjhan S.S.R. and the establishment of tea experimental stations across the rest of the Union. Even so, it appears that in order to achieve the 1960 goal of 210,035 acres, idle land in western Georgia, Krasnodarsk Krai and the Len-

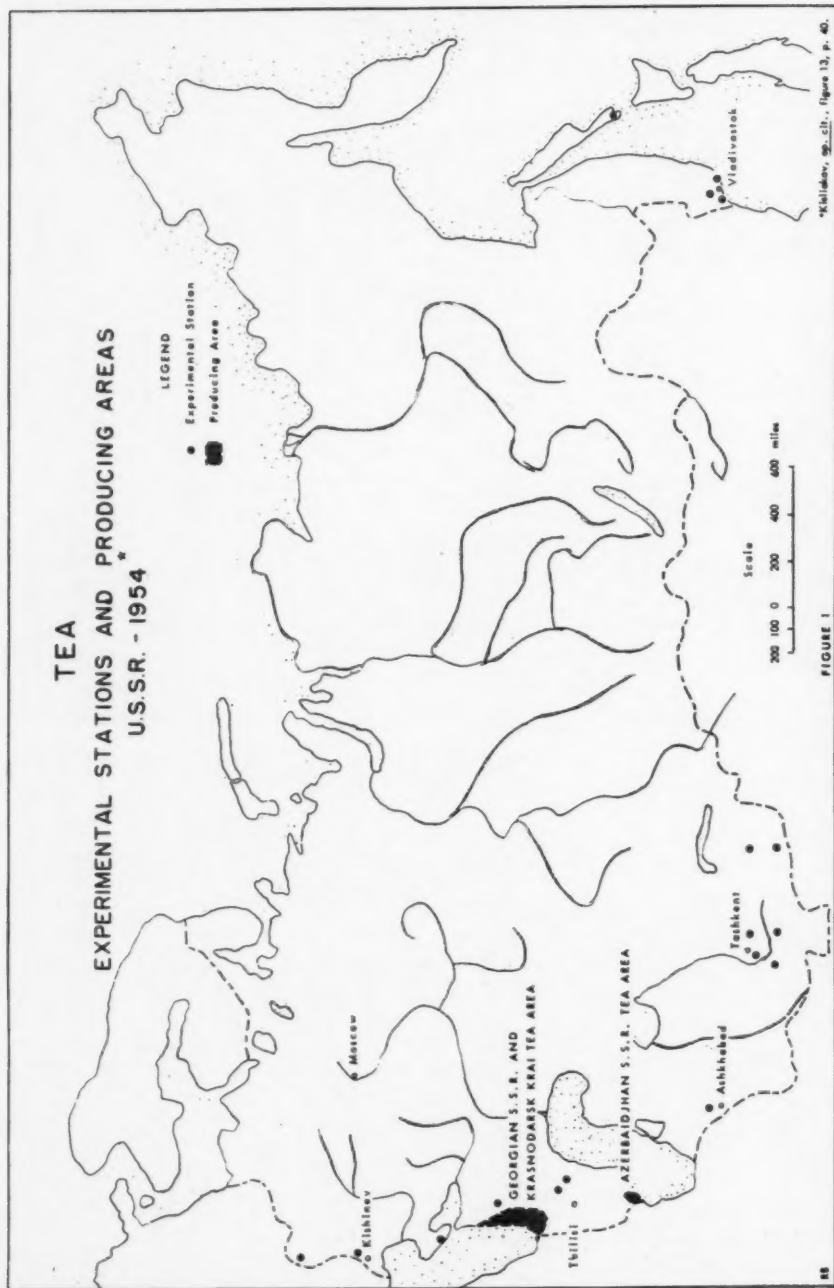
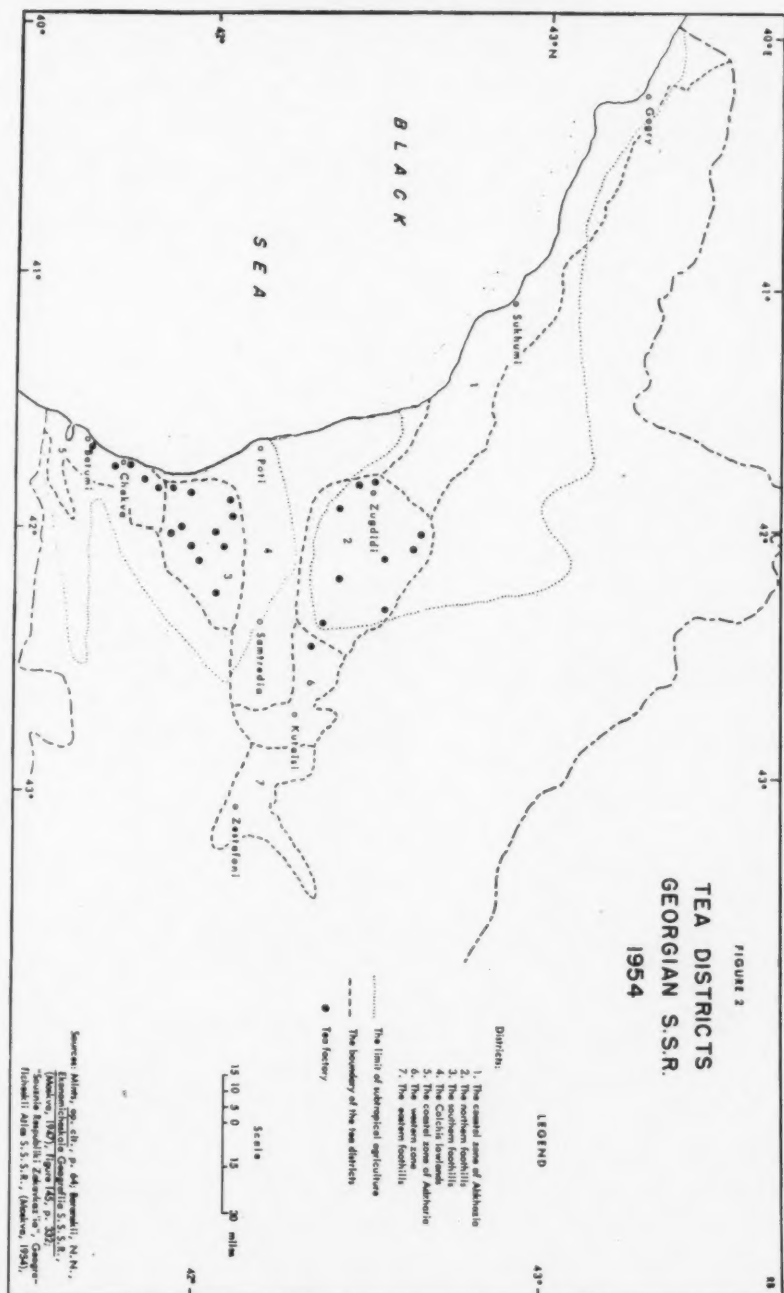


Fig. 1. Soviet Tea Producing areas and Experiment Stations



TEA ACREAGE IN THE U.S.S.R. - 1915-1960

Sources: Ulan, *op. cit.*, pp. 206, 207, and 442; Shmidt, *op. cit.*, p. 30; Wickizer, *op. cit.*, p. 21; Yearbook of Food and Agriculture Statistics (Food and Agricultural Organization of the United Nations, Washington, 1947), p. 46; Vedenkii, *op. cit.*, p. 44; Kufitakov, *op. cit.*, pp. 20 and 24; Minko, *op. cit.*, p. 63; Cherdantsev and others, *op. cit.*, p. 218; Volin, L., *A Survey of Soviet Russian Agriculture*, (Agriculture Monograph 5, U.S. Agriculture Dept., August 1951), p. 151.

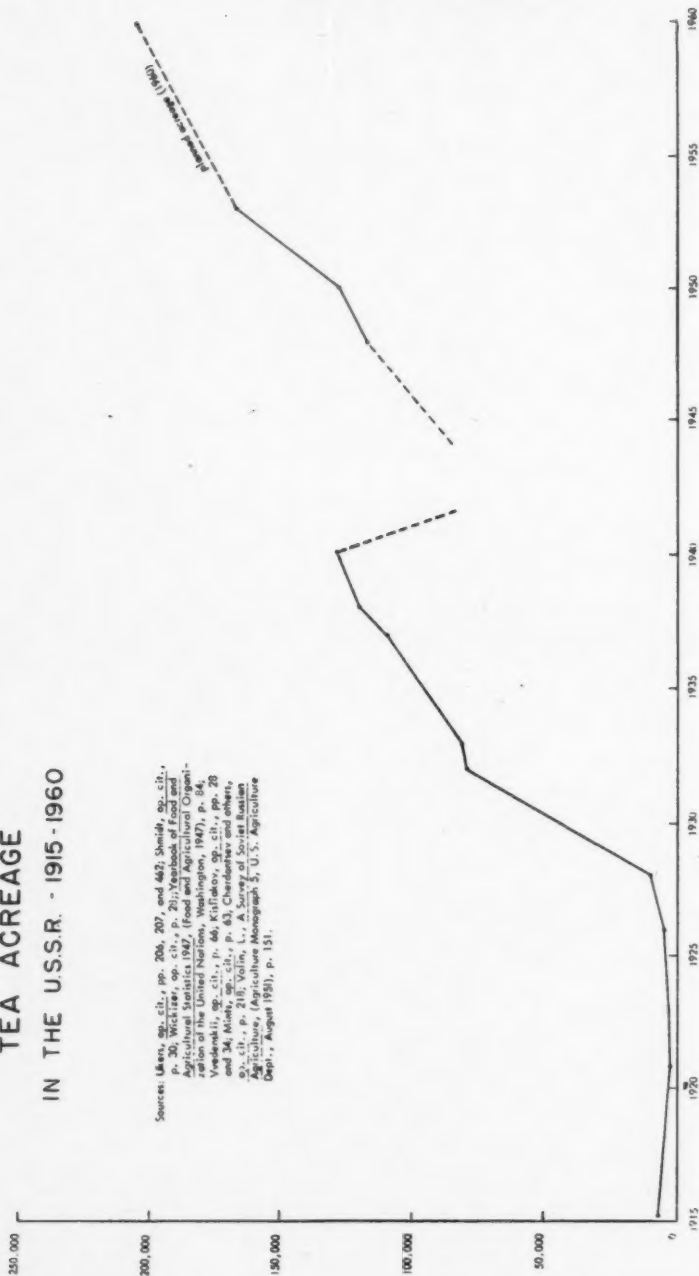


Fig. 3. Soviet Tea Acreage



Fig. 4. Soviet Import and Production of Tea

koran area of Azerbaidjhan S.S.R. will be utilized.

Providing the Soviets reach the 210,035 acre goal by 1960, it appears feasible at that time Georgia would possess close to 180,000 acres of tea plantations. Of this increase Abkhazia and the northern foothills (districts 1 and 2) would receive roughly 50% (15,000 acres) of this increase; the western zone and eastern foothills 25%; the southern foothills and the Colchis lowland 20%; and Adzharia about 3%.²¹

The second most important tea region in the Union is located in Azerbaidjahn S.S.R., containing in 1953 about 9% of total cultivated tea lands. The climate here is characterized by a summer dry period, creating the need for irrigation.²² Added to this problem is the greater temperature variation causing corresponding variations in the type of tea leaf as far as taste, aroma, etc., is concerned. For these reasons alone, it is difficult to rationalize the continued allocation of resources to tea expansion considering the additional cost of irrigated land and the lower quality of leaf. If considerable expansion does occur here, as suggested by Soviet writers, the development emphasizes the lack of better conditions and, therefore, the poor agricultural conditions that remain as well as the rigidity of the autarkic import policy.²³

The Krasnodarsk Krai of the Russian F.S.S.R. contained 4% or 7,413 acres of tea land in 1953. It is not a separate area but rather a northern extension of the Georgian development. Approximately 500 acres are cultivated as far north as the Kuban River in 1952.²⁴ However, most of the tea lands lie in the foothills of the southern coastal zone of the krai, particularly near, and south of, the town of Tuapse. The difficulties of expanding acreage revolve about the marginal climatic conditions, such as the shorter growing period (185-200 days in Kuban valley against 232 in Anaseuli, western Georgia), lower and greater range of temperatures, smaller sum of growing temperatures, and less moisture than western Georgia.²⁵ It appears that only limited expansion will occur here.

The New Regions

Confronted with the dilemma of increasing tea production in face of the scarcity of subtropical land, attention was focused on other parts of the Union. Plans were actually laid, during the late 1940's for the establishment of tea experimental stations in areas in the Carpathian mountains of the Ukrainian and Moldavian S.S.R.'s, in the Crimea, in the northern slopes of the Caucasus mountains, in the Central Asian Republics, in the area near Vladivostok, the southern tip of Sakhalin Island and Kunashiri Island. In all cases, the experiment was well under way by 1950, although even by 1955 it was apparent many complex climatic and ecological problems remained unsolved.

However, by 1955, only the stations in the Carpathian mountains and the Crimea of the Ukrainian S.S.R., the Kirghiz S.S.R., the Uzbek S.S.R., and the Krasnodarsk Krai, held promise of developing "commercial size" plantations. At these stations, investigations will be continued with the ultimate hope of utilizing the estimated 24,000 acres of land, but no large scale cultivation will be attempted until several more years of investigations are completed.²⁵

Temperature Data (F°)

| Station* | Years of | Jan. | Feb. | Mar. | Apr. | May | June | |
|----------------|----------|------|------|------|------|------|------|----------|
| 1. Chust | 3 | 24.8 | 26.8 | 21.7 | 51.3 | 59.9 | 61.5 | |
| 2. Kishinev | 50 | 24.8 | 27.1 | 35.8 | 48.2 | 50.1 | 66.9 | |
| 3. Vladivostok | | | | | | | | |
| | 35 | 7.3 | 13.8 | 26.4 | 39.9 | 49.1 | 56.5 | |
| 4. Poti | — | 40.9 | 42.6 | 47.7 | 53.6 | 62.6 | 71.6 | |
| | | | | | | | | Absolute |
| | | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. | Minimum |
| Chust | | 67.8 | 64.9 | 57.9 | 48.7 | 39.2 | 32.2 | -11.4 |
| Kishinev | | 71.4 | 71.8 | 61.2 | 50.7 | 25.7 | 28.9 | -15.7 |
| Vladivostok | | 64.6 | 69.1 | 61.7 | 48.7 | 31.1 | 14.7 | -22 |
| Poti | | 72.5 | 74.3 | 71.6 | 64.1 | 52.7 | 45.4 | — |

* 1 and 2 — Ukrainian Stations (Carpathian Mountains)

3 — Far East Station

4 — Western Georgian Station

At the other stations, the chief limiting factor was temperature. As 5°F damages the plant, the temperatures of -4°F and lower, which occurred in these stations, eliminated the possibility of tea cultivation here. The severity of the climate was revealed at the Alagir station located in North Osseti A.S.S.R. (of the Russian F.S.S.R.) which saw from 1949 to 1952 only 7% of the plants survive.²⁶

Conclusion

The significance of tea production in Russia has increased greatly under the Soviets, particularly since the 1930's. Production is centered in the subtropics of the Georgian S.S.R. and absorbs about 6% of the Republic's cropped plowland, most of which is located in its sub-tropical climatic zone.²⁷

Even though the Soviet Union has created a large tea industry, imports have always played an important role. Since the barter trade agreements with India and the inclusion of China in the communist orbit, imports have formed about 20% of the national consumption of tea. In 1946 alone, India exported 20 million lbs. to Russia.²⁸

At least until 1960, tea production will continue to come almost entirely from the old regions of the republics of Georgia and Azerbaidjahn, and the Krasnodarsk krai. However, research will be continued in the new regions, with investigations centering on climatic problems.

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2. *Ibid.*, p. 23; C. I. Vavilov, **Bol'shaia Sovetskaia Entsiklopediia**, (Moskva, vol. 13, 1949), p. 66; Yearbook of Food and Agriculture Statistics, **Trade 1954**, (Rome, 1955, vol. 8, part 2), p. 183.
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11. *Ibid.*, pp. 462-463; M. Dobb, **Soviet Economic Development Since 1917**, (New York, 1948), p. 87.
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17. Kisliakov, *op. cit.*, p. 34.
18. Mints, *op. cit.*, p. 63.
19. **Soviet News**, London, May 16, 1953.
20. Kisliakov, *op. cit.*, p. 28.
21. Mints, *op. cit.*, pp. 64-67.
22. Kisliakov, *op. cit.*, p. 32.

23. According to the 1949 edition of the **Bol-shaia Sovetskaia Entsiklopediia**, acreage was to reach 54,800 acres by 1956. In other publications of a later date, no evidence was given of any change over the 1953 figure of 16,062 acres.
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25. A. F. Zinina, I. Jz. Fel'dman, "Mikroklimaticheskie Usloviia Raionov Kul'turi Chaia Na Kubani V Letnee Vremia", **Izvestiia Akademii Nauk S.S.S.R.**, (Seriia Geograficheskaiia, No. 5, Moskva, 1955,) pp. 40-43.
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27. The 6% figure was estimated from the 1950 Georgian cropped ploughland of 937,000 hectares which came from Jasny, N., **The Socialized Agriculture of the U.S.S.R.**, (Stanford University Press, 1949), p. 524.
28. J. P. Ewing, "Tea Included in India's Five-Year Trade Treaty with Soviet Union", **The Tea and Coffee Trade Journal**, (January, 1954), p. 41; J. P. Quinn, "China Tea Stages Bid for Markets as Communists Aid Revival of Trade", **The Tea and Coffee Trade Journal**, (Sept. 1952), p. 62.



NINETEENTH ANNUAL MEETING**Seattle, Washington, June 14 - 16, 1956**

The nineteenth annual meeting of the Association was held at the University of Washington in conjunction with the annual meeting of the Pacific Division, American Association for the Advancement of Science. Four half day sessions were devoted to research papers and a business meeting. Saturday morning was devoted to a boat tour of the Seattle waterfront, arranged by Howard Martin. The address of the retiring President, H. Bowman Hawkes, was presented on Friday evening, June 15, at the annual dinner in the Edmund Meany Hotel.

Program of Papers Presented

(Papers marked with an asterisk are published in this issue)

- *GEORGIA ALLEN ADAMS, University of Oregon, Two Isochronic Maps of Settlement in Oregon.
- *HOWARD K. ALBANO, University of Washington, Livestock Organization in the Formerly Nomadic Livestock Areas of the Soviet Union.
- BRIAN J. L. BERRY, University of Washington, The Present State of the Concept of Spatial Interaction.
- *ROBERT M. BONE, University of Washington, The Development and Significance of Tea Cultivation in the Soviet Union.
- CLARKE BROOKE, Portland State College, The Central Highlands of Ethiopia.
- HARRY H. CALDWELL AND DEAN LYCAN, University of Idaho, Stump Ranching in Latah County, Idaho.
- WOODROW R. CLEVINGER, Washington State Department of Agriculture, A Method of Constructing Three-Dimensional Diagrams of County Areas.
- SAMUEL N. DICKEN, University of Oregon, Land Forms and Land Use on the Southern Oregon Coast.
- D. R. EBERHART, Larry Smith & Co., Seattle, Washington, Geographic Factors in Real Estate Consulting.
- WILLIAM L. GARRISON, University of Washington, Experimental Measurements of Geographic Relationships Between Rural Roads and Location Utility with Reference to some Aspects of the Location of Agriculture and Concepts of Spatial Structure.
- *CLARENCE J. GLACKEN, University of California, Berkeley, Culture and the Idea of Nature.
- *HOWARD F. GREGOR, San Jose State College, The Geographic Dynamism of California Market Gardening.
- *H. BOWMAN HAWKES, University of Utah, Conservation; Retrospect and Prospect.
- J. ROSS MACKAY, University of British Columbia, Tundra Polygons in the Arctic Landscape.
- DUANE F. MARBLE, University of Washington, The Use of High Speed Data Processing Equipment in Geographic Research Activities.

- DUANE F. MARBLE and ROBERT M. WRIGHT, University of Washington and Boeing Airplane Co., Seattle, High Speed Computation of the Azimuthal Equidistant Projection.
- HOWARD H. MARTIN, University of Washington, Rubber in Southeast Asia.
- WILLIS B. MERRIAM, Washington State College, Irrigation Progress in the Mexican Northwest.
- MARION E. MARTS, University of Washington, A Population Forecast for the Quincy School District, Washington.
- HAZEL R. NEWHOUSE, Portland Extension Center, Oregon, The Azores.
- JOHN D. NYSTUEN, University of Washington, The Origins of Certain Fresh Fruits and Vegetables Arriving at Produce Markets of Some Major Cities of the United States.
- *FORREST R. PITTS, University of Oregon, The 'Logic' of the Seventeenth Parallel as a Boundary in Indochina.
- J. E. SPENCER, University of California, Los Angeles, Terraces and Terracing in South and Eastern Asia.

Abridged Report of the Secretary-Treasurer

The membership of the Association, on June 12, 1956, consisted of 12 paid-up contributing members, 117 paid-up regular members, and 12 paid-up student members, a total of 141 members in good standing. An additional 46 members were in delinquent standing.

There were no official motions passed by the business meeting affecting the regular operation of the Association.

INCOME DEPOSITS

| | |
|---|------------|
| Bank Balance, 6-6-56 | \$ 222.34 |
| Dues, Sales, Contributions | 912.80 |
| Dues Rebate from AAG for Divisional Members | 84.93 |
| Total Deposits | \$1,220.07 |

WITHDRAWAL OF FUNDS

| | |
|--|------------|
| Printing Yearbook, Volume 17 | \$ 722.80 |
| Advance to Printer for Author Reprints | 83.60 |
| Postage Charges | 12.99 |
| Total Withdrawals | 819.39 |
| Bank Balance, 12-6-56 | 400.68 |
| | \$1,220.07 |

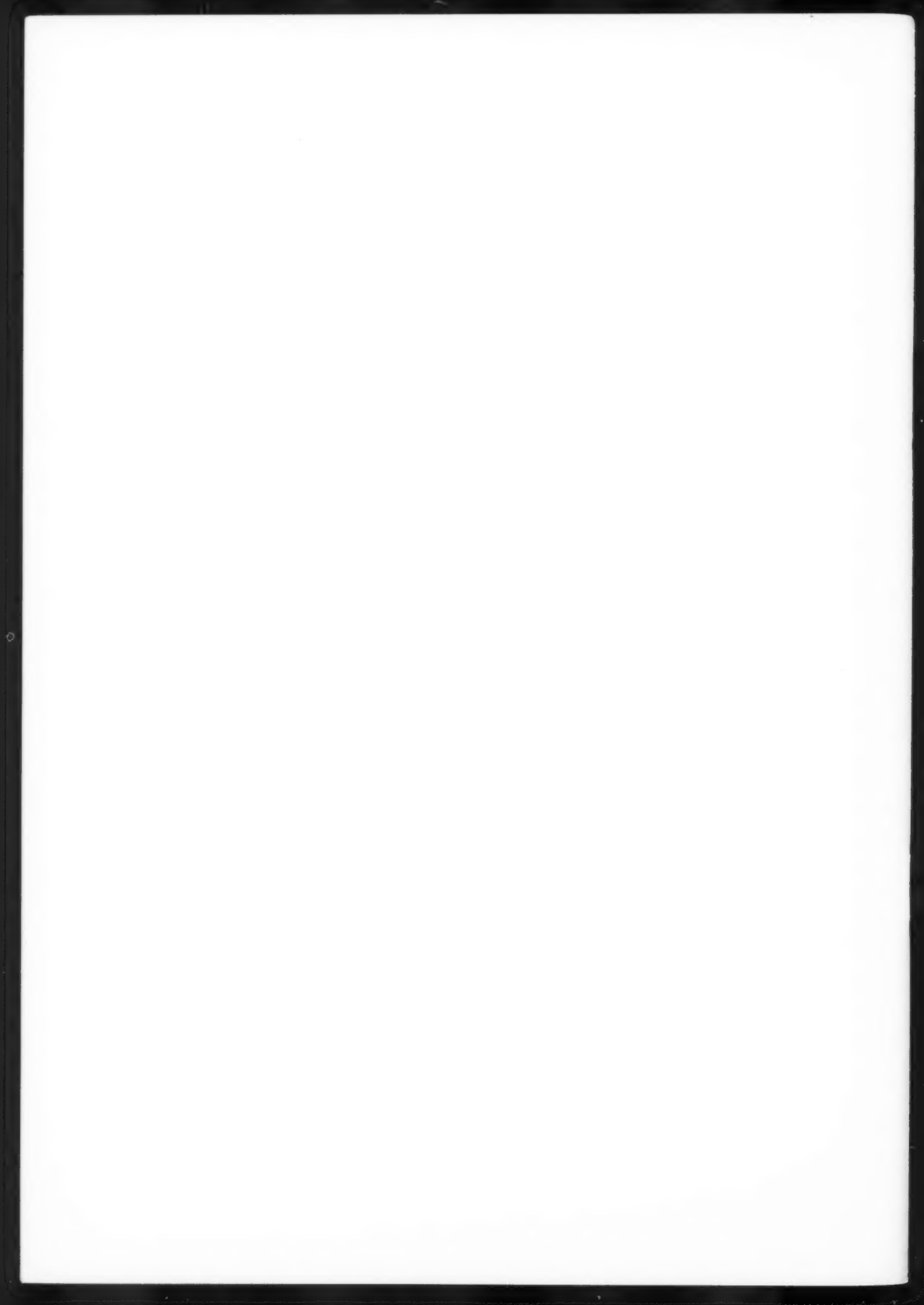
Officers, 1956 - 1957

President: Huey Louis Kostanick, University of California, Los Angeles.

Vice-President: Vacant.

Secretary-Treasurer: Willis B. Merriam, Washington State College, Pullman, Washington.

Editor: J. E. Spencer, University of California, Los Angeles.



81

81

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